Course code: URP 4128
Course title: Transportation Planning Studio
Group: 14

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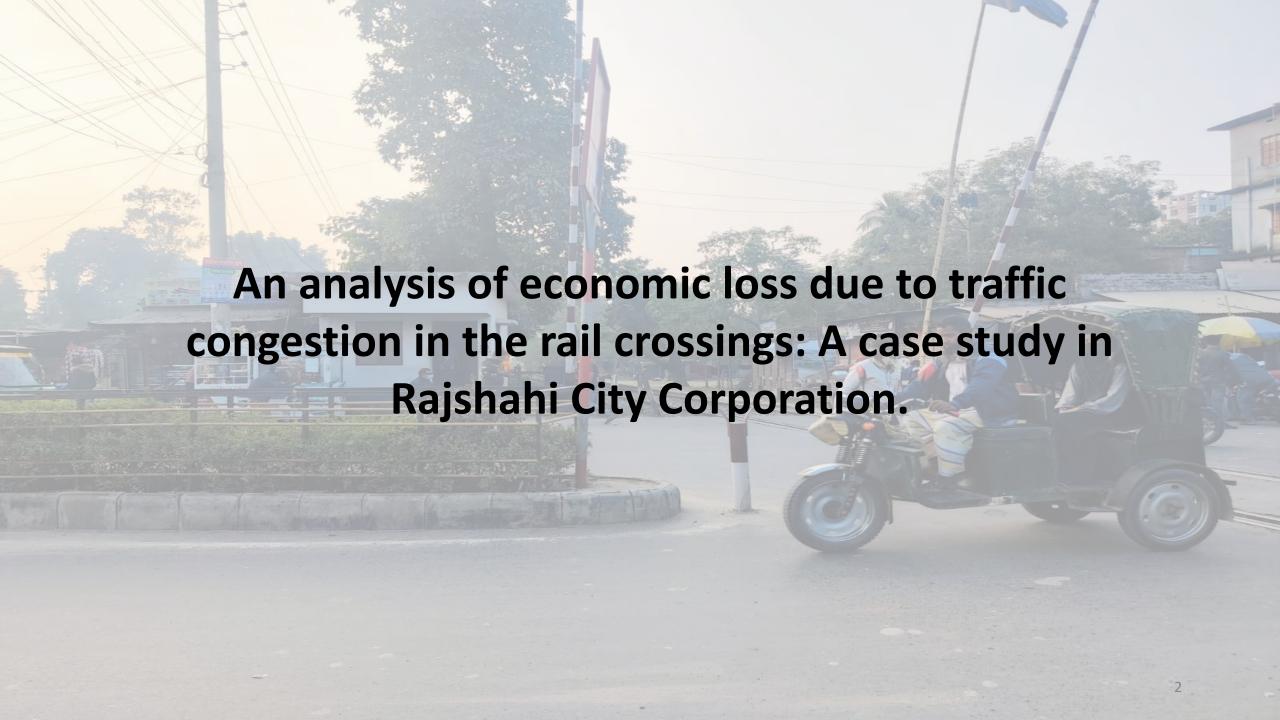1707055

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Date: 07 January, 2022

An analysis of economic loss due to traffic congestion in the rail crossings: A case study in Rajshahi City Corporation.
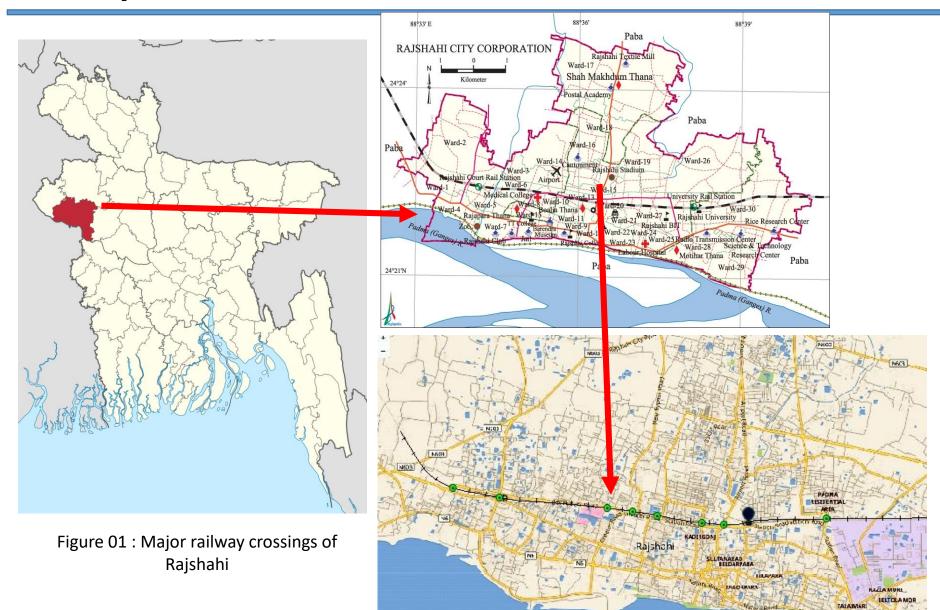
Background

- In Rajshahi, there are several number off **railway crossings** where a huge amount of delay occurs.

- These **delay** causes a huge amount of **economic loss.**

- So this loss should be minimized.

Objective

1. To **monitor and evaluate the traffic congestion scenario** at rail crossings.

2. To **estimate the economic loss** for congestion in the rail crossings.

Study area

Figure 01 : Major railway crossings of Rajshahi

- Vodra
- Railgate
- Nogor Bhaban
- Bornali
- Bondhogate
- City Bypass
- Rajshahi Court Station
- Raipara

Literature Review

Case Study 01:Traffic Congestion Induced Cost of A Road Section: A Study on Fulbarigate to Dakbangla Midblock, Khulna

The objective of the study is to estimate economic loss due to traffic congestion. The study measured three major types of hidden cost (i.e. opportunity cost, vehicle operating cost and externality cost) due to traffic congestion in monetary values.

Case Study 02: Estimating Costs of Traffic Congestion in Dhaka City

The main goal of the study is to estimate the impacts of traffic congestion in monetary terms for Dhaka city. The study estimated the total traffic congestion cost of Dhaka city with the available data. This study also identified different important item costs associated with traffic congestion using economic theory, i.e. travel time delay, travel time variability, vehicle operating cost, externality costs etc.

Coordination Schema

Objectives	Complex variable	Simple variable	Data Type	Data Source	Collection method
To monitor and evaluate the traffic congestion scenario at rail crossings.	Demographic Information	1. Age 2. Gender	Qualitative & Quantitative	Primary	Questionnaire
	Crossing Information	1. Gate Activity 2. Lighting 3. Facilities 4. Lighting 5. Safety Measures	Qualitative	Primary	Questionnaire
	Traffic Congestion	1. Type of Vehicles 2. Number of Vehicles 3. No of Train cross this intersection 4. Time Duration 5. No of time in crossing	Qualitative and Quantitative	Primary & Secondary	Questionnaire & Railway data.

Coordination Schema

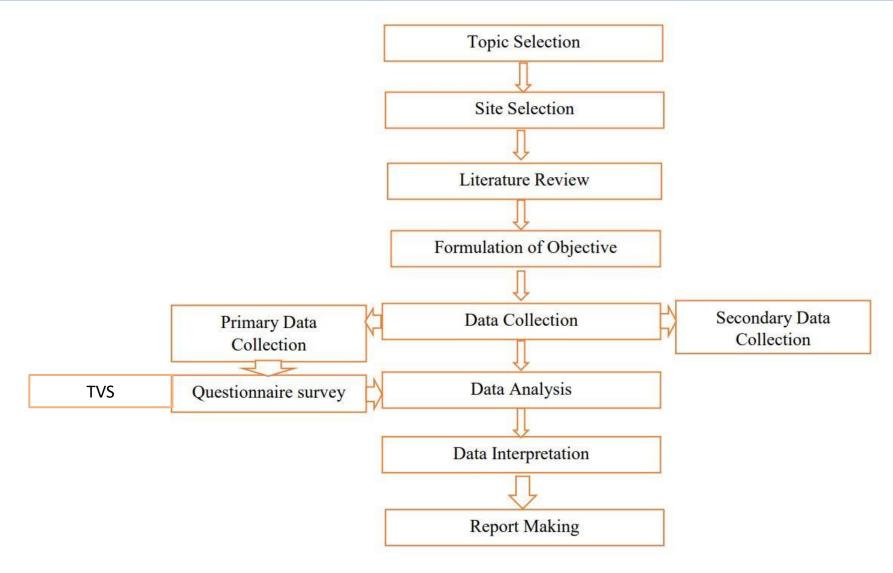| To estimate the economic loss for congestion in the rail crossings.	Economic Loss	1. Type of Vehicles 2. Number of Vehicles 3. Time duration 4. No of time in crossing 5. A General Trip time 6. Income from that trip	Quantitative and qualitative	Primary	Physical observation , Questionnaire & Traffic Volume Survey

Methodology

Figure 02 :Flow chart of methodology
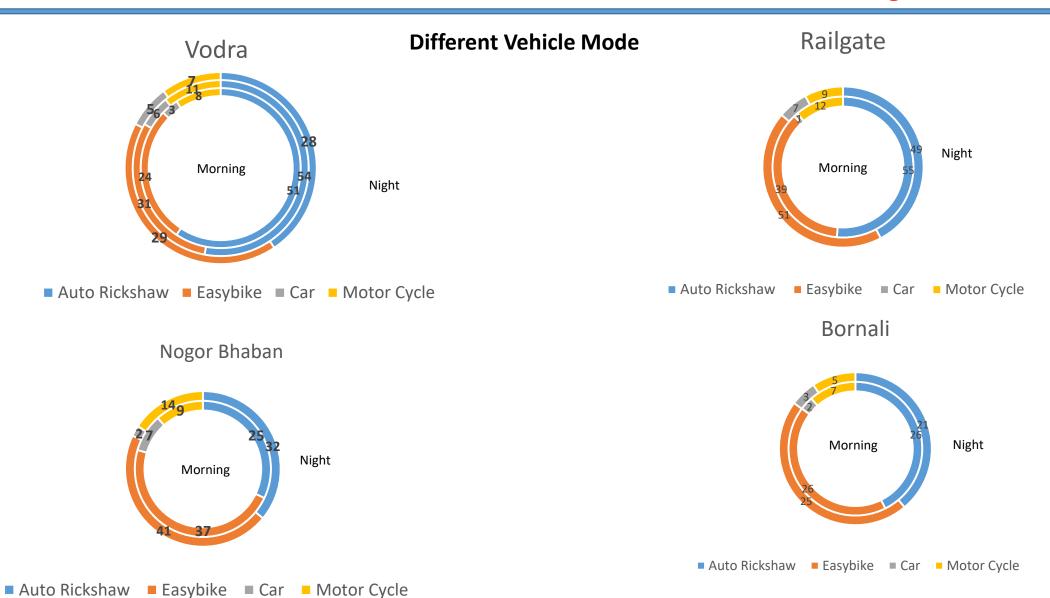
Data Collection & Calculation

- The **types of vehicle and volume** will be identified with **Traffic Volume survey .**

- Total number of time the rail crossing are need to remain stopped is observed.

- **Loss for each vehicle** will be calculated by **comparing** the most common **trip value and time** needed for the trip.

- Then **total loss** of each intersection can be calculated.

Data Collection & Calculation

- **Economic loss of Auto Rickshaw = L_a**
- Total Time Loss for one stoppage= T
- Time of one possible trip= t
- Income from that possible Trip =M
- Number of vehicles= N
- T/t= Number of possible trips.
- **L_a= T/t * M *N**
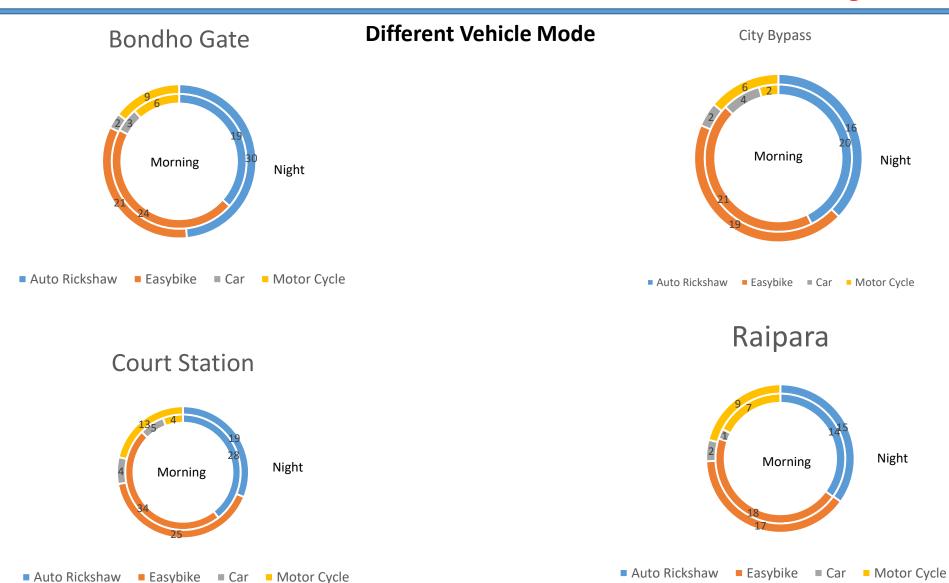- So, Total Loss, L= L_a + L_b + L_c+ ………….+ L_n (a= Auto rickshaw, b=Bus, c= Car, etc.)

Data Analysis

Different Vehicle Mode

Vodra

Morning / Night

28, 54, 51, 24, 31, 29, 5, 6, 3, 7, 1, 1, 8

Auto Rickshaw Easybike Car Motor Cycle

Railgate

Morning / Night

49, 55, 39, 51, 7, 1, 9, 12

Auto Rickshaw Easybike Car Motor Cycle

Nogor Bhaban

Morning / Night

25, 32, 27, 41, 37, 14, 9

Auto Rickshaw Easybike Car Motor Cycle

Bornali

Morning / Night

21, 26, 26, 25, 3, 2, 5, 7

Auto Rickshaw Easybike Car Motor Cycle

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Data Analysis

Different Vehicle Mode

Bondho Gate

City Bypass

Court Station

Raipara

Data Analysis
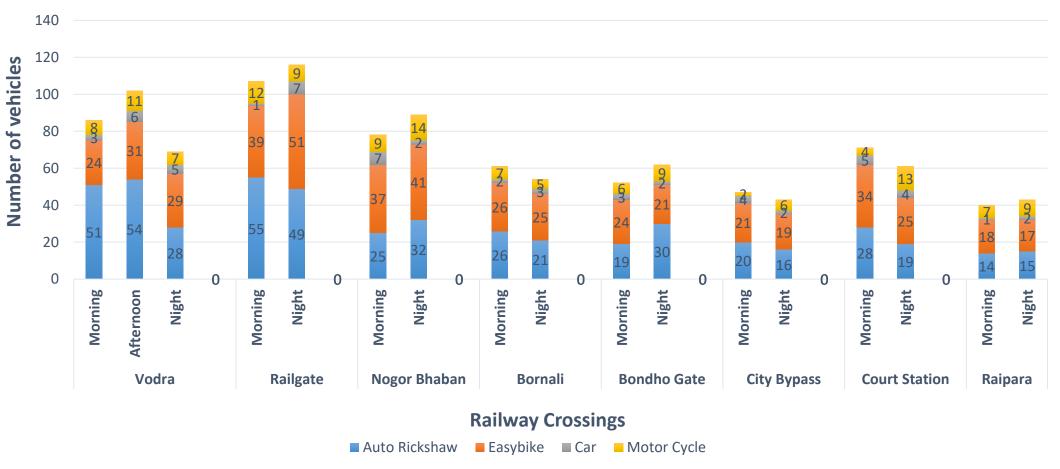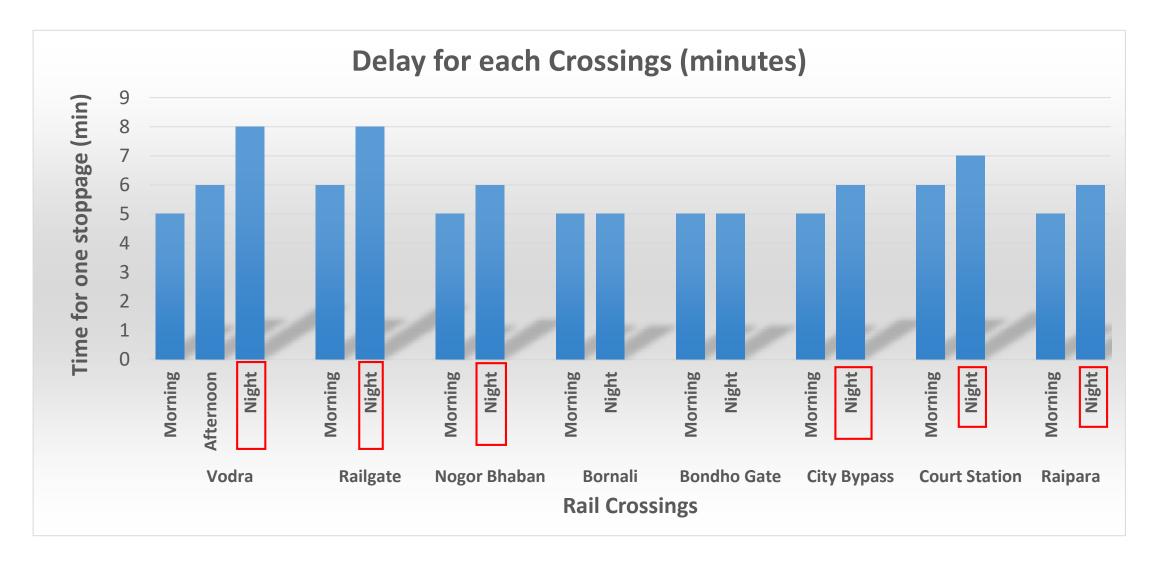
Volume of vehicles at each Crossing for one stoppage

Legend: ■ Auto Rickshaw ■ Easybike ■ Car ■ Motor Cycle

Y-axis: Number of vehicles

X-axis: Railway Crossings

Data Analysis

Delay for each Crossings (minutes)

Data Analysis

Loss at **Vodra** Crossing = 48510

Easy Bikes

Time Period	Total time loss (min)	Possible trip(min)	Possible Income (taka)	Le (taka)	Total loss Le*No of Stoppage	Total Loss for Easy bikes (per Day)
Morning	5	6	25	708.33	6374.97	
Afternoon	6	6	25	775	10075	22236.61
Night	8	6	20	723.33	5786.64	

Auto Rickshaw

Time Period	Total time loss (min)	Possible trip (min)	Possible Income (taka)	La (taka)	Total loss La*No of Stoppage	Total Loss for Auto Rickshaw (per Day)
Morning	5	5	15	918	8262	
Afternoon	6	5	15	972	12636	26274
Night	8	5	15	672	5376	

Data Analysis

Loss at **Railgate** Intersection=18575

Easy Bikes

Time Period	Total time loss (min)	Possible trip(min)	Possible Income (taka)	Le(taka)	Total loss Le*No of Stoppage	Total Loss for Easybikes (per Day)
Morning	6	6	25	975	2925	9725
Night	8	6	20	1360	6800	

Auto Rickshaw

Time Period	Total time loss (min)	Possible trip(min)	Possible Income (taka)	La(taka)	Total loss La*No of Stoppage	Total Loss for Auto Rickshaw (per Day)
Morning	6	5	15	990	2970	8850
Night	8	5	15	1568	5880	
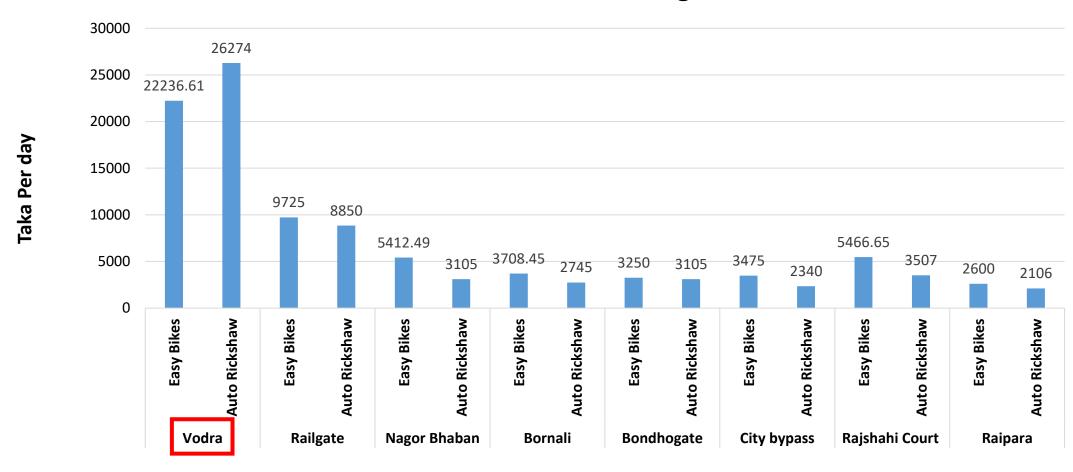
Data Analysis
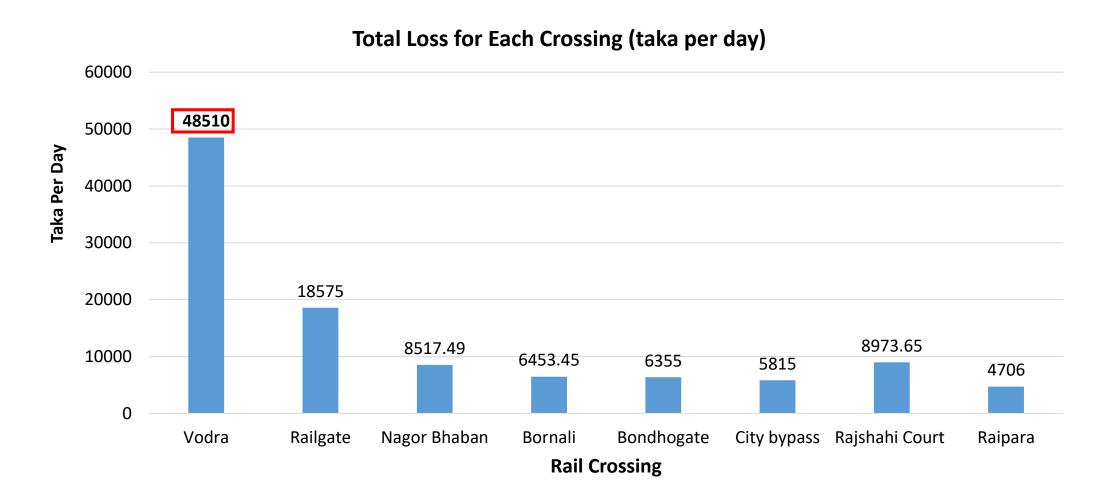
• Loss at other crossings

Rail Crossing	Type of Vehicle	Loss (taka)	Total loss of Crossing (per Day)
Nagor Bhaban	Easy Bikes	5412.49	8517.49
	Auto Rickshaw	3105	
Bornali	Easy Bikes	3708.45	6453.45
	Auto Rickshaw	2745	
Bondhogate	Easy Bikes	3250	6355
	Auto Rickshaw	3105	
City bypass	Easy Bikes	3475	5815
	Auto Rickshaw	2340	
Rajshahi Court	Easy Bikes	5466.65	8973.65
	Auto Rickshaw	3507	
Raipara	Easy Bikes	2600	4706
	Auto Rickshaw	2106	
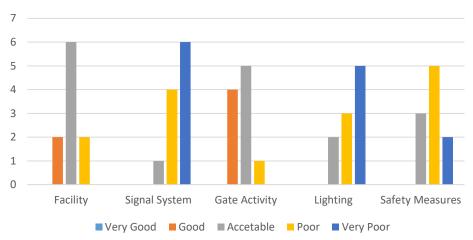
Data Analysis

Total Loss for Each Crossing (taka per day)

Bar chart — Taka Per Day vs Rail Crossing:
- Vodra: **48510**
- Railgate: 18575
- Nagor Bhaban: 8517.49
- Bornali: 6453.45
- Bondhogate: 6355
- City bypass: 5815
- Rajshahi Court: 8973.65
- Raipara: 4706

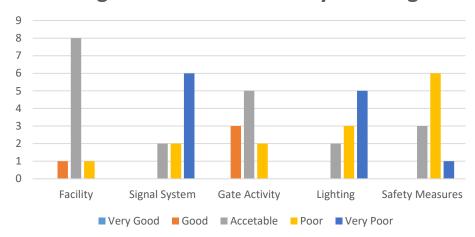# Satisfaction Level of the Respondents about Intersections:

Vodra Railway Crossing
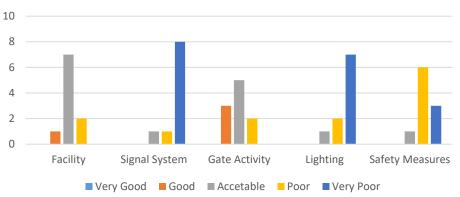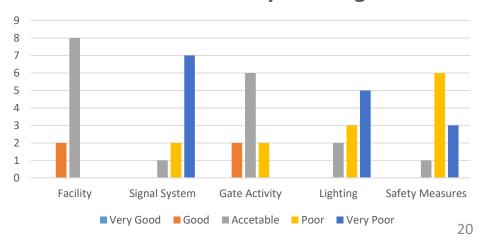
Shaheed AHM Kamaruzzaman Railway crossing

Nogor Vobon Mor Railway Crossing
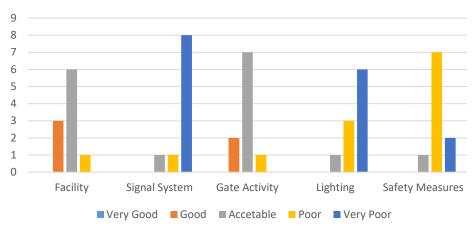
Barnali Railway Crossing

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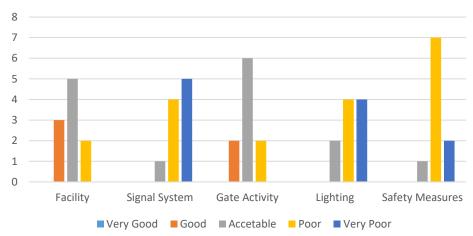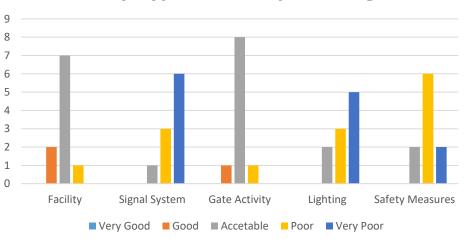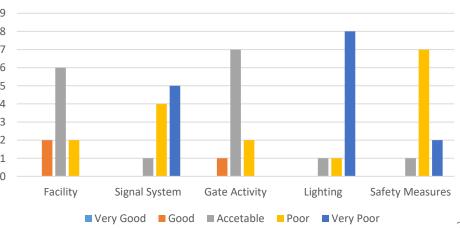# Satisfaction Level of the Respondents about Intersections:
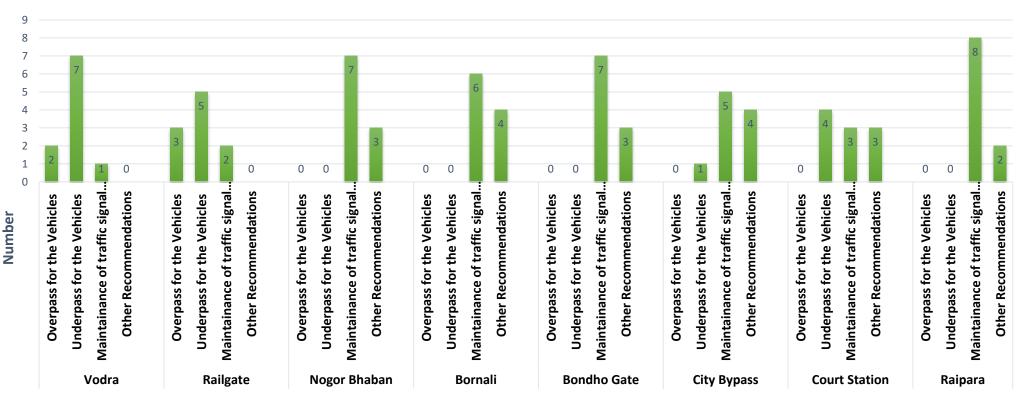

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Findings

- The **maximum loss** occurs in **Vodra** Railway Crossing.

- Meanwhile the **minimum loss** occurs in **Raipara** Railway crossing.

- At **night the delay occurs much more** because of long stoppage time.

- There is **no proper signal system and lighting** in any of the crossings.

- The **safety and security system is inadequate** in every crossing.

- Autorickshaw drivers and easy bike drivers have suffered the most.

- Peoples satisfaction about the **activities and facilities is very poor**.

Recommendation from the Respondents

Recommendation from Respondents

Recommendation

- **Underpass for vehicles** in Vodra crossing as the loss is maximum here.

- Proper **signal system and lighting** for every crossings.

- **Communication** between gateman and the responsible authority.

- Using advance **technology for proper signal** and signing system.

- **Awareness** among the pedestrians and vehicle operators.

- Adequate **facilities and services.**

- Proper and timely **gate activity.**

- Proper **maintenance** of the system.

Limitation

- **Minor railway crossings** are **excluded** from this study.

- Only **auto rickshaw and easy bikes** are considered for economic loss as these are the most used vehicle in Rajshahi.

- As the survey is done **manually** so there can be **error** in counting.

- Survey is done in **three shift**. And each shift ,survey is done only one time .

- The **freight trains are excluded** from the calculation.

Conclusion

- In economy railway crossing has great impact.

- Because of poor maintenance city's economic development is greatly hampered.

- In Vodra crossing the loss is maximum so much concentration should be given upon this crossing.

- The proper facility, services as well as maintenance should be ensured.

- The traffic rule should be maintained properly.

- And responsible authority should take necessary steps to minimize the loss.

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THANK YOU