SPEED PROFILE ANALYSIS AT THE SPEED BREAKERS AT NEW MARKET LOCATION IN DHAKA CITY

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A Thesis Submitted to the Department of Civil Engineering, Daffodil International University in Partial Fulfillment of the requirements for The Degree of

Bachelor of Science in Civil Engineering

Department of Civil Engineering

Daffodil International University

May, 2023

CERTIFICATION

"Speed Profile Analysis at the Speed Breakers at New Market Location in Dhaka City" is done by the following students under Mr Rakibul Hassan (Assistant professor) my direct supervision and this work has been carried out by them in the Department of Civil Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Civil Engineering. The presentation of the work was held in 10 May 2023.

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DECLARATION

We hereby certify that we are the sole authors of this thesis and that no portion of it, nor the entirethesis, has been submitted for a degree to any other university or institution. We certify that the Speed Breakers analysis at the Speed Breakers project report was completed by us under the supervision of Mr. Rakibul Hassan, Department of Civil Engineering, Daffodil International University.

ACKNOWLEDGEMENT

Thank you, ALLAH, for allowing us to finish this thesis work on time. We would liketo express our heartfelt gratitude to our instructor, Mr. Rakibul Hassan, for providing us with the golden opportunity to complete this outstanding task on the topic "Speedprofile at the velocity breakers at New Market area in Dhaka city," which also assisted us in conducting extensive research and introducing us to many new things. We certainly appreciate him.

At last, we would like to express our gratitude to our parents for their spiritual and financial support, as well as to all of our friends and well-wishers for their unwaveringencouragement.

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DEDICATION

We dedicate this work to the Almighty ALLAH first and foremost, as well as to our parents and teachers for their unwavering support and assistance.

ABSTRACT

A speed breaker is a rounded hump surface across the roadway which is provided to slow down the vehicles. Speed breakers are employed primarily at the locations where vehicles interact with vulnerable road user's i.e. pedestrians in bulk volume. Furthermore, to prevent accidents resulting from over speeding of vehicles, speed-breakers are employed at some locations along the roadway. However, accidents may occur regardless of presence or absence of speed-breakers. Improper use of speed breaker might act as a catalyst for causing accidents. The purpose of this study is to determine the variation in speed for different vehicles at a speed breaker located along New market to Azimpur road section at Dhaka. To observe the variation of speed along the speed-breaker, we considered an 80 ft. road segment keeping the speed-beaker at middle. This approach will allow us to observe how drivers decelerate before approaching to the speed breaker and accelerates leaving the speed breaker. Since we did not have the access to speed gun, we used indirect method to calculate the instantaneous speed of vehicles. For this, we further subdivided the 80 segment into 5 small segments and marked them at the field and recorded the video using smartphone to calculate the time required for vehicles to cross those segments. Analysis shows that the behavior of driver for bus, car and rickshaw are not same at the speed breaker. On an average, bus drivers reduced their speed from 13.16 km/hr to 8.12 km/hr while reaching at the hump of speed breaker, afterwards they increased their speed from 8.12 km/hr to 10.61 km/hr while leaving the speed breaker. On the other hand, car driver's speed before the speed breaker hump, at the speed breaker hump and after the hump were observed to be 17.55 km/hr, 11.6 km/hr and 15.23 km/hr respectively. Whereas rickshaw drivers speed for those threes case was observed 10.97 km/hr, 8.11 km/hr and 8.88 km/hr respectively. Therefore, it can be said that the low speed vehicle's speed reduction rate is lower than the fast moving vehicles.

CHAPTER 1: INTRODUCTION

1.1 General

Speed breakers are very important to control the speed of the vehicle. In developed countries, speed breakers play a very important role in controlling the speed of their vehicles. In developed countries, speed breakers are considered to silence traffic. When the vehicle driver knows that there is a speed breaker ahead, he must control the speed of his vehicle. Speed breakers are of different types such as plastic speed breakers, and normal speed breakers (ex: concrete or rock-made). Plastic speed breakers are not common in our country, but plastic speed breakers are used in developed countries. Such as China, the USA, the UK, Japan, etc. Common speed breakers are used in our country but they work well if used properly**.**

1.2 Background of study

Speed breakers are normally used in some vital specific locations and some crucial places. Speed breakers are used solely in school-college-madrasa hospitals and some necessary people's offices and speed breakers are used at all locations the place frequent pedestrians pass due to the fact the usage of speed breakers reduces cars installments relatively. There is a unique coverage on what kind of speed breaker needs to be used at which location. In locations where very small cars cross and many pedestrians go on the road, the top of the speed breaker is barely greater and its size is shorter. On roads that elevate heavy site visitors however want to manipulate the speed of the vehicles, the speed breakers are slightly large and the top is a good deal shorter or shorter so that the automobiles can pass ahead easily.

1.3 Objectives

The main objectives of the study are:

- The study aims to examine and evaluate the speed of vehicles passing through the speed breakers in New-Market to Azimpur zone.
- The research will identify the type of vehicles and count their numbers. The collected data will assist in analyzing the speed profile of the vehicles at the new market speed breakers.

1.4 Problem Statement

The purpose of speed profiles, which are elevated pavements set at an angle to the road, is to get drivers to slow down. Those speed bumps serve a vital role in reducing accidents on the tight turns and residential streets of Dhaka. The length, height, anddesign of speed breakers greatly affect how much speed is lowered. Speed bumps,speed humps, and artificial speed breakers are often used types of speed breakers. We analyzed the speeds of various vehicle classes in Dhaka and determined the optimal bump height for each road segment based on the varying speeds of the cars that useit. Dhaka's New Market was chosen as the three sites for this. Each of the aforementioned roadways' volume was measured at regular intervals of 80 feet. Video was taken at busy times, and the difference in speeds before and after 10 meters from speed breakers was tallied.

CAPTER 2: LITERATURE REVIEW

2.1 Speed Profile Analysis on Speed Breakers

Designing and maintaining roads with a focus on traffic safety is essential. However, as the global population travels more by car, a deeper awareness of road traffic safety becomes important. Speed is the primary indicator of a roadway system's traffic performance, since it reflects the quality of service experienced by the traffic flow. Inaccident-prone locations, speed bumps, also known as road bumps, are commonly used to regulate vehicle speed and improve traffic safety. Excessive provision of speedbreakers causes annoyance and pain among road users. According to the 2015 Road Accident Report by the Hossain and Farque (2019) 4,726 persons were killed annually due to road humps, while 6,672 were killed owing to potholes and speed breakers. Speed humps should only be installed in locations where speed-related collisions are prevalent. Different types of speed breakers result in varying degrees of speed decrease (Hasen). They are detailed below and illustrated in Figure 2.1.

(a) **(b)** **(c)** **(d)**

Figure 2.1: Types of Speed Breakers

(a) Speed Bumps, (b) Speed Humps, (c) Speed Cushions, (d) Speed Tables

2.2 Importance of speed breaker

Speed breakers are essential for safety. Speed breakers are provided in various important places such as educational institutions, hospitals, and garment factories, andin populated areas speed breakers are used more to avoid acid ends. Accidents arereduced to a great extent due to the use of speed breakers but there are some rules forusing speed breakers (Hasen, 2016). Such a speed breaker should be properly placedin the right place and there should be marking and lighting with it. Proper marking lighting can reduce accidents. When we go down a fast road, seeing the speed breaker forces the car to slow down. Speed breaker protects the motor from accidents.

Pedestrians can easily cross the road due to the presence of speed breakers. Tallam (2016) reported 44% of accidents can be avoided by using speed breakers on roads. For this reason, if speed breakers are installed on every highway, people will be savedfrom many accidents. Its significance is more in densely populated cities, if speed breakers are used, many accidents are reduced and automobile drivers can control the speed of their vehicles.

2.3 Purpose of speed breaker study

In the conclusion of the Speed Breaker chapter, we are aware that accidents can happen if there are no speed breakers on the road. A speed breaker provides safety forpeople, and automobiles to cross the road. It is recognized what the speed breakerwilllook like and what color should be used i.e. we can recognize how many types of speed breakers (Georgiev & Kunchev, 2019). How to get to the speed breaker and from a distance, you can understand the front speed breaker. I can be aware of the location of the speed breaker. Generally, people cross more in front of schools, colleges, universities, spiritual institutions, libraries, theatres, and residential houses,so I can understand why speed is given on the road for their safety. No automobile canbe overtaken by a speed breaker on the road, some of the problems caused by providing speed breakers, such as people losing time to go somewhere, and victims suffering from crossing problems, can be found. This is a primary drawback for emergency vehicles like ambulances, fire carriers, etc. There are some speed breakerson the road which are built without traffic signs. Due to the lack of markings or trafficsigns on the roads, accidents are constantly happening.

2.4 Utilization and effects of Speed Bumps on Automobiles

In both emerging and developed nations, road accidents and injuries are becoming substantial contributors to mortality. Therefore, traffic calming is necessary ontoday's highways. Multiple strong solutions are required to make highways absolutelysafe for users, cars, and the environment. In order to ensure the safety of cars and theenvironment, it is necessary to implement steps to reduce speed. However, if similar designs and structures are implemented without the usage of recognized criteria, theycould cause chaos and have serious consequences for people, vehicles, and the

environment. Consequently, there is a need for rapid identification and elimination ofthese issues, i.e., if designs are wrong, they should be removed and replaced with newones that have the correct proportions, which would aid in the reduction of traffic- related issues (Raj *et al.*, 2019).

For speed reduction and traffic management, a multitude of measures, including signboards, chicanes, speed breakers, driver education, raised intersections, roundabouts, and traffic circles, can be adopted. Figure 2.2 depicts several horizontaland vertical flow retardation measures, which include the following:

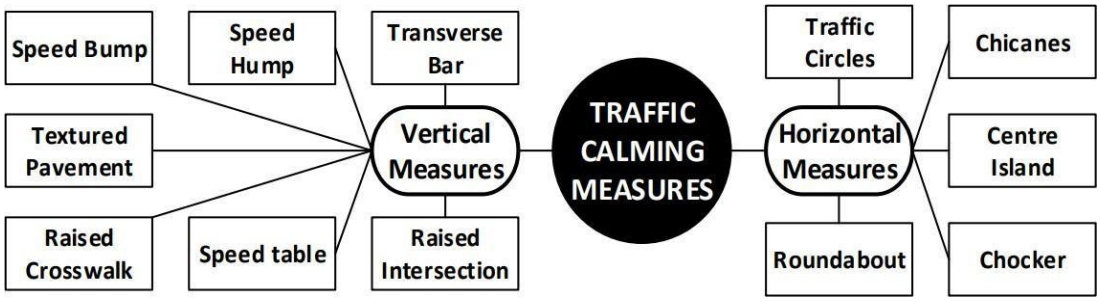


Figure 2.2: Several traffic calming strategies Source: Raj *et al.*, 2019

Rfff, the main focus is on speed breakers or speed bumps, which are used to slow down vehicles and reduce the risk of accidents and injuries. Careless construction of speed breakers without proper planning could endanger drivers' lives. Unfortunately, speed breakers are often undervalued in two ways: first, since they are often installed in inappropriate locations where they are superfluous, and second, because they are often built improperly without approved design usage. Research has been done on everything from motorcycles to rickshaws, and everything in between. Whole-Body Vibration (WBV) and vehicle damage are common outcomes of these road imperfections (Rathee et al, 2021).

2.1.1 Impacts on vehicles

The vehicle has deteriorated mostly owing to damage to the undercarriage, wear andtear on the brakes and tires, suspension problems, and damage to internal components. The influence that speed bumps have on moving cars is depicted in Figure

2.2. An exhaustive literature review on the effects of vehicles as well as rules for the design and installation of speed humps created the network layout that can be seen inFigure 2.3.

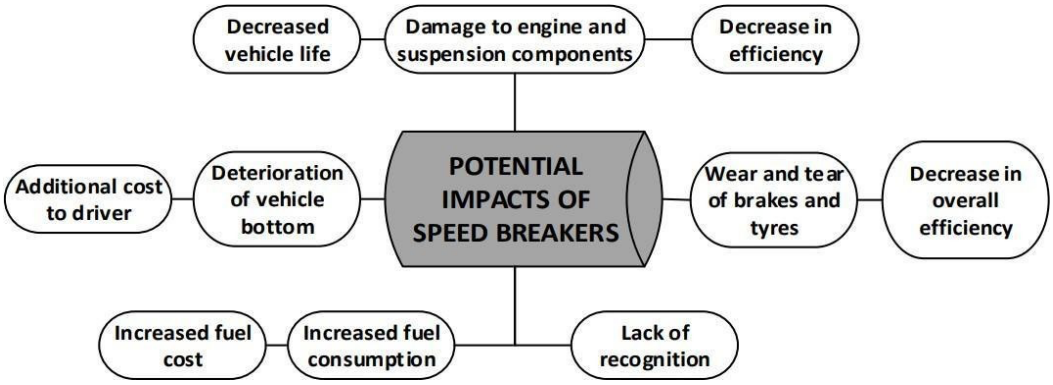


Figure 2.3: Potential impacts of speed breakers on vehicle (Source: Rathee *et al.*, 2021)

2.1.2 Speed management and community acceptance

On the basis of a 1992 literature review and survey, an analysis into the utilization ofroad bumps as speed moderators in metropolitan areas was done. In this study, community acceptability was investigated, and acceptance-influencing elements were identified. Utilizing survey methods, the impact of the speed spike experience in the population was determined. Control of the vehicle, heat, noise, and vibration were among the issues observed as a result of road bumps. It has been discovered that emergency vehicles may experience pain, damage, security rules, and delays.

2.1.3 Designs and Speed Behavior

The University of Leeds conducted a study on the speed of road design on driving speeds in 1997. A number of methods for slowing down a vehicle were evaluated in this literature. Indirect influences on driving behavior were examined in this study.

In 2000, ITE journal published a discussion on geometric standards for speed humps,in which the contribution of innovative designs was regarded as the major goal for users in countries with widely varying environmental conditions (Choong et al, 2020), vehicle attributes, and driver expectations. Shock absorbers in the suspension systemreduce the vertical acceleration that would otherwise be caused. The length of the speed hump was highlighted as an important design feature due to the correlation between its length and the magnitude of the linear dynamic effects it would produce.In the initial stage, a radar gun was utilized to log the recorded speeds. Mesaros

Anghel *et al.* (2014) focused on root Sum of Square (RSS) equal to discomfort criteria

was used to quantify the level of discomfort experienced by test subjects during the second phase of the study, which involved studies performed in an off-road environment. The findings suggested a larger sample size was necessary to define pain thresholds. Because the humps in the Watts and Seminole profiles are the same profile, further research should focus on varying the ramp slopes.

Yadav and Srivastava (2014) noted in 1992, it was described how flat-topped tables, humps, raised junctions, cushions, and chicanes were the most frequent trafficcalming devices in industrialized countries like the United Kingdom. A model for traffic calming was provided in 2000 under the Transportation Research subheading;the analysis focused on the effects of various traffic-calming measure combinations on the speed of unconstrained vehicles. At strategic, traffic-calmed locations, data onmotorist habits was gathered. For the purpose of estimating model variables, regression was used. It was determined that speed tables had the largest effect on speeds, followed by speed humps, chicanes, and cushions, with further analysis into the design of banked turns being warranted.

2.1.4 Passive speed control strategies

According to the Deevela *et al.* (2019), vertical undulations on roads were employed to reduce speed in the 1970s, and since then, they have become a widespread passive means of reducing speed in many countries. Many studies have examined the speed ofundulations in reducing speeds up to the 85^{th} and 50^{th} percentiles, respectively, for thepurpose of traffic calming. To reduce speed and reduce mortality in urban areas, speedbumps were examined in Italy in 2001. It was also claimed that speed humps' benefitsin reducing accidents and protecting pedestrians outweigh their expenses, which include fixing damaged cars.

2.1.5 Optimal Designs of Speed Humps

Streets with speed humps can be either one- or two-way. You shouldn't put them on roads that hospitals and rescue services use. Traffic slowing measures like speed

humps and tables are installed to make cycling more convenient and secure. At the 2007 annual ITE meeting, recommendations were proposed for the creation of speedbumps. It has been observed that the construction and design of speed humps vary throughout jurisdictions and are met with opposition from various parties. An exhaustive literature analysis was used to develop these state-of-the-art principles, andan online survey was used to supplement this information and help fill in the gapsshown by the resulting framework. The primary users of split speed tables areemergency services and public transportation providers. It was mentioned that stakeholders such citizens, business owners, property owners, emergency services, schools, hospitals, medical centers, transit operators, road maintenance employees, snow plow operators, and garbage collection agencies should be consulted before anyhumps are built. After speed humps were put in place, drivers slowed down and therewas less traffic overall. Olajide (2022) argued that by implementing speed humps andtables in communities around the country, a framework was designed with the assistance of several agencies (Olajide *et al.*, 2022).

The purpose of installing speed humps in residential areas is to slow down traffic andreduce the likelihood of accidents. For the reasons stated by Saadoon, speed bumps are not reliable for maintaining the targeted speed limits. According to research by Cross and Wasters, the jarring effect of shocks accounts for 36% of all back injuries sustained by operators of moving machinery. In 2007, researchers employed a seat pad accelerometer to assess the risks posed by WBV brought on by Speed Control Humps (SCHs) in a variety of ergonomic settings, finding that hump geometry was the primary factor affecting the shocks brought on by these undulations. Car model, placement of passengers, speed, and hump geometry were also considered. Thefindings indicated that circular humps are riskier, and two novel humps werepresented that performed better (Iqbal *et al.*, 2016). The focus of the research at handis on the deconstruction of old buildings and the planning of brand-new replacements.

2.2 Previous Literature Gap

Alam *et al.* (2011) focused on motor vehicles driving without any regard for speed limits are a leading cause of accidents in the country. The law related to speeding is rarely enforced, and instead, a reliance on speed breakers actually contributes to moreaccidents than it helps at curbing speeding vehicles. Maniruzzaman and Mitra (2005)

noted the drivers should be warned of the presence of speed breakers by posting suitable advance warning signs. Vehicle over speed is one of the major factors for road accidents (Hoque, 2004). To control speed in sensitive areas speed breakers are used across the road. Generally, the speed breakers are of width 9 meters with the height ranging from 6 to 30cms (Hamim *et al.*, 2019), speed breakers are effective in keeping vehicle speeds down, their use is sometimes controversial as they can increase traffic noise, may damage vehicles if traversed at too great a speed, and slow emergency vehicles. The pattern of placement of speed breakers depends upon the location and the type of treatment used. Some of the suggested locations have alreadybeen indicated in Clause 2. At 'T' intersections, speed breakers should be installed on minor roads (Ahmed, Ahmed, & Hainin, 2014); perpendicular arms about 10 meters awayfrom the inner edges of major roads. Proper sign boards and markings are required to be provided at such locations. Normally we know speed breakers are raised sections of pavement across the travel way on the road and are approximately 3 to 4 inches high (2014). Speed bumps should be located at proper locations otherwise, it causes more traffic problems. Alireza, *et al.* (2013) conducted a study for finding the best location for placing of speed breakers. The vehicle load acted upon the speed breaker system is transmitted to rack and pinion arrangements. Then, reciprocating motion of the speed-breaker is converted into rotary motion using the rack and pinion arrangement where the axis of the pinion is coupled with the sprocketarrangement. The utilization of electrical energy is going to increase with the growthof population. Electricity is generated when the vehicle moves over the speed breaker,Hamim *et al.*,2019).

CHAPTER 3: MATERIALS AND METHODS

3.1 Study Design

Trial experimental based thesis has been designed. For analyzing the speed profile atspeed breaker of New Market in Dhaka city. The methodology adopted at the location can be explained in the flow chart.

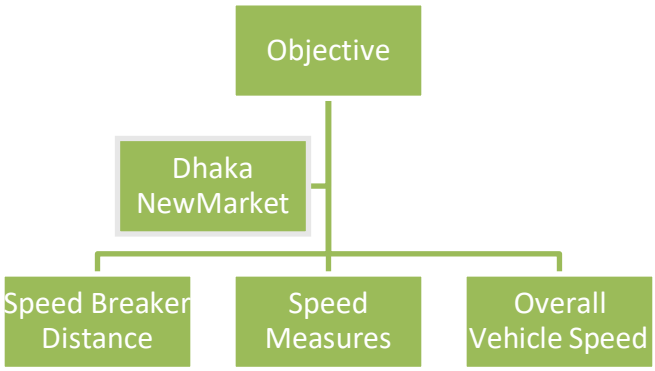


Figure 3.1: Flow chart of study design

3.2 Study Area Brief

New Market: New Market is a traffic importance location in Dhaka city. This avenueco

Figure 3.2: New Market

(Source: https://www.google.com/maps/place/New Market,+Dhaka/

Figure 3.1 Speed Breaker New Market to Azimpur connected to Mirpur widest road in Dhaka City, Located in front of Eden Women college.

3.3 **Data Collection Point**

Every country is progressing differently, and the biggest contributor to this progressisthe transportation system. Transportation is driving civilization to a brighter future.This is our working point on Thursday, September 22, 2022, at 10:00 am. I observed the video at home and found out the total number and types of vehicles in 1 hour at New Market. This is the location of New Market. Dhaka speed breaker longitude: 23°43'54.3"N 90°23'07.4"E, latitude: 23.731743, 90.385393

Figure 3.5: New Market front side Midpoint Speed Breaker Source: Smartphone camera, September 22, 2022

Figure 3.6: New Market back side Midpoint Speed Breaker,Source: Smartphone camera, September 22, 2022

This is our working point on Thursday, September 22, at 12:10 pm and by observingthe video at home by recording we found out the total number and types of vehicles in1 hour at New Market. This is the location of New Market located: 23°43'54.3"N 90°23'07.4"E, latitude: 23.731743, 90.385393.

Figure 3.7: New Market back side Midpoint Speed Breaker

Source: Smartphone camera, September 22, 2022

Figure 3.8: New Market back side Midpoint Speed Breaker,

Source: Smartphone camera, September 22, 2022

3.4 Used of Materials

1) Tape measure
2) Smartphone
3) Chalk

3.5 Tape measure

Its compact size makes it ideal for measuring long distances on the go and for stowingaway in a toolbox. It has become so commonplace now that you can buy a small version to carry on your keychain. Tape measures longer than 100 meters arecommonly used by surveyors. The metal blade is marked in linear increments, and itcomes with a protective sheath, a button that acts as a stopper, a belt clip, an end hook, and a hand stripe. This device is widely used as a standard unit of measurement.Its compact size makes it ideal for measuring long distances on the go and for stowingaway in a toolbox. It has become so popular that it is now available as a keychain fobor novelty item in miniature.

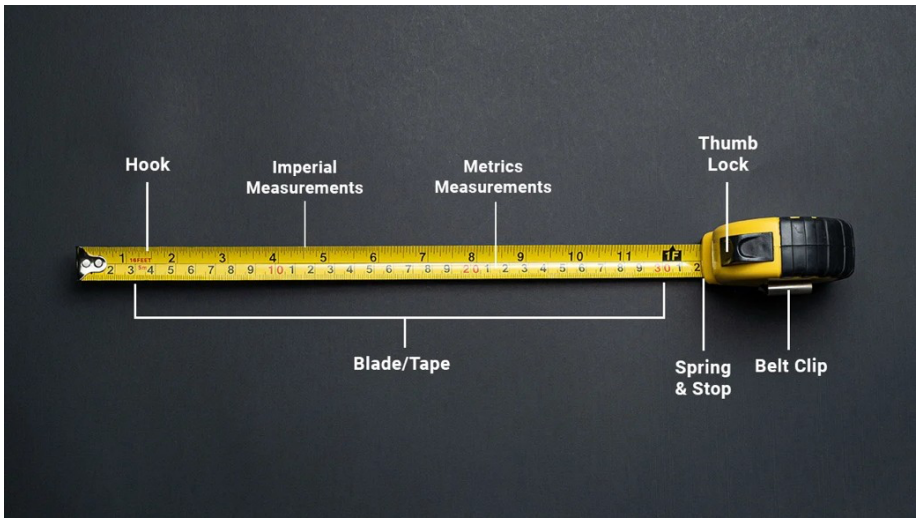


Figure 3.11: Steel Tape (Sample)

3.5.1 Speed Gun

Speed trap gun is a device used to measure the speed of moving objects. It is used in law-enforcement to measure the speed of moving vehicles and is often used in professional spectator sport, for things such as the measurement of bowling speeds incricket, speed of pitched baseballs, and speed of tennis serves. A radar speed gun is aDoppler radar unit that may be hand-held, vehicle-mounted or static. It measures thespeed of the objects at which it is pointed by detecting a change in frequency of the returned radar signal caused by the Doppler effect, whereby the frequency of the returned signal is increased in proportion to the object's speed of approach if the object is approaching, and lowered if the object is receding. These tools are collected from local traffic police by consent.

Figure 3.12: Speed Gun (Sample)

N:B- (We didn’t use a speed gun. But for better understandings & educational purposes we included this device)

3.5.2 Smartphone

We used the best Smartphone for video recording and portrait photography with the iphone11 best smartphone for photography on the measured vehicle speed in the studyarea.

3.5.3 Chalk

A chalk is a reusable writing surface on a speed breaker area and measures distancesign with road.

3.6 Experimental Method

We are selected for experimental study constant 0-15 feet and total measures area 0-80 feet limit with speed breakers.

Area Name	Area for Speed Measures
New Market	80 Feet

Table 3.1: Speed measurement area by location

CHAPTER 4: DATA ANALYSIS AND RESULTS

4.1 Introduction

There has been some discussion of experimental surveys on speed profile analysis of speed breakers measures, distance, and cars continuing into speed breakers junction.This chapter also discusses in detail a particular point of the site within the selecting region of the city of Dhaka. Performing calculations on speed data ranging from 0 to15 feet and converting to kilometers per distance.

4.2 New Market

Table 4.1 reveals that out of 157 vehicles, the majority are Bus (8.8%) and Truck (4.71%). car(12.35%), Rickshaw (30%) , Bike(8.82%) , Leguna(17.06%) , Cng(7.6%) , Mini-truck (4.12%).vehicles were also discovered in the experimental survey. There are 2,790 vehicle movements every hour in New Market of Dhaka city.

Vehicles	The number of vehicles	The number of vehicles (%)
Bus	15	8.8
Truck	8	4.71
Car	21	12.35
Rickshaw	51	30
Bike	15	8.82
Leguna	29	17.06
CNG	11	7.6
Mini-truck	7	4.12
Total	157	92.36

Table 4.1: Vehicles count of New Market

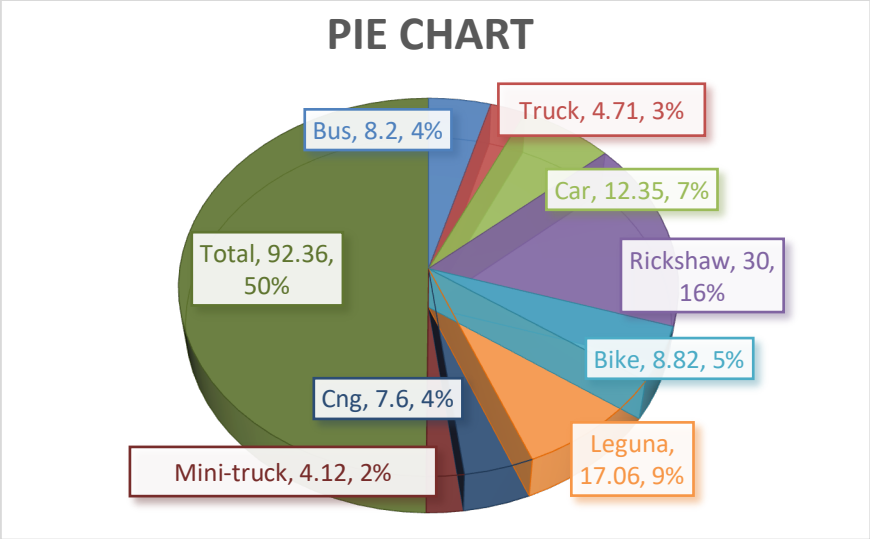


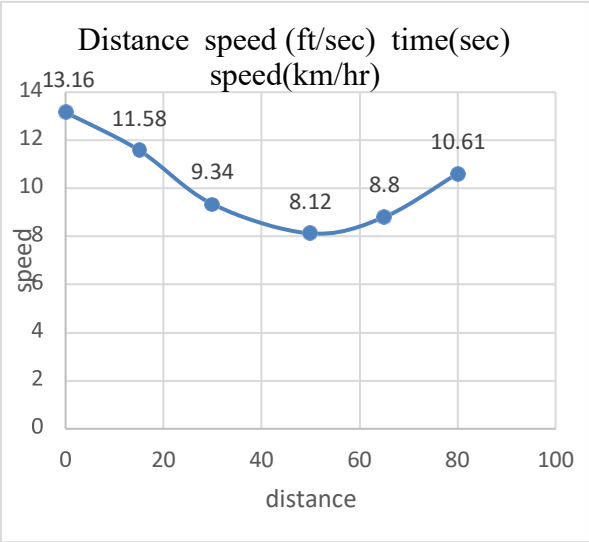
Figure 4.1: Vehicles count of New Market

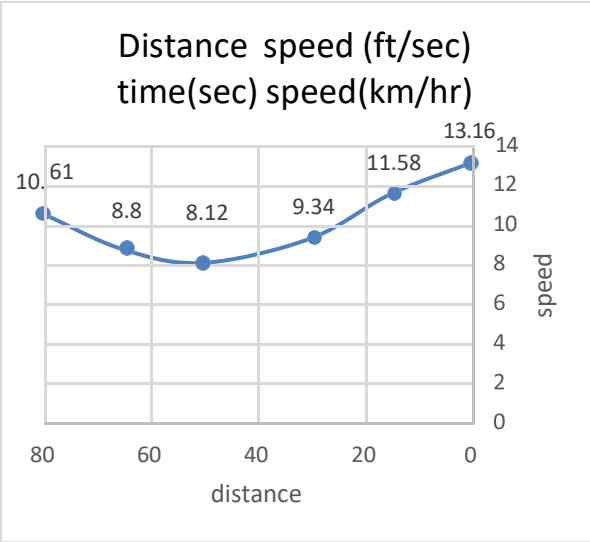
4.1.1 Speed Analysis of Bus

Table 4.2 reveals that calculating speed breaker distance 20 ft of total 0-80 ft measures. We found that the maximum speed was 13.16 km/hr (1 sec) in 0 feet and minimum 8.12 km/hr (2.7 sec.) in 50 feet for buses, located in New Market. We calculated here. Speed = Total distance/Total time.

Distance	Speed (ft/sec)	Time(sec)	Speed(km/hr)
80	**9.677419**	**1.55**	**10.61**
65	**8.02139**	**1.87**	**8.8**
50	**7.407407**	**2.7**	**8.12**
30	**8.522727**	**1.76**	**9.34**
15	**10.56338**	**1.42**	**11.58**
0	**12**	**1**	**13.16**

Table 4.2: Speed calculation of bus at New Market





Distance (ft) by speed calculated of buses at New Market in show figure 4.3

Speed graph of bus at New Market.

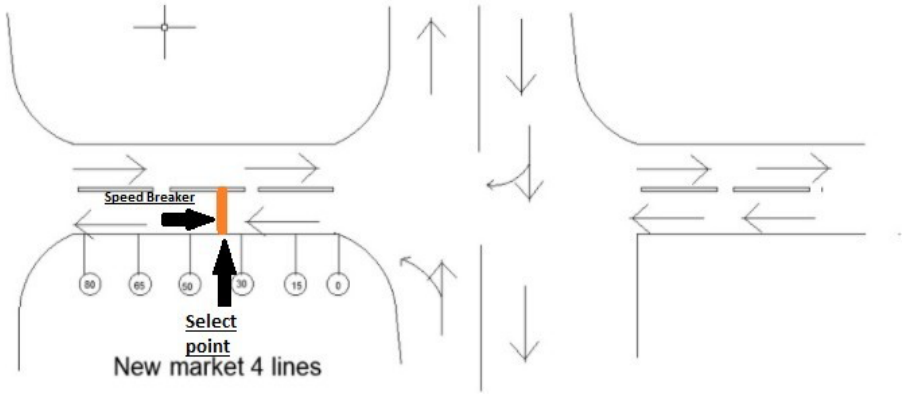


Figure 4.2: Top view of New Market to Azimpur

We are segmented speed breaker 5 portion, constant per height 1" in 0 feet, after 5' height into 5", middle point of speed breaker height 7.5", similarly 5" for 15 feetand last 1" for measures 20 feet we found figure 4.4.

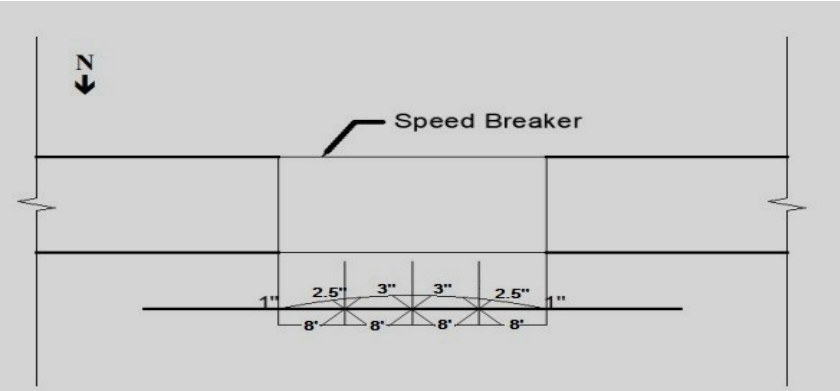


Figure 4.4: Speed breaker side view of New Market

Figure 4.4: Speed breaker side view of New Market

4.1.2 Speed Analysis of Truck

According to Table 4.3, 20 feet of the total 0-80 feet measures are accounted for when computing speed breaker distance. For trucks on New Market, we measured top speeds of 13.16 km/h (1 second) after traveling zero feet and lowest speeds of 8.7 km/h(2.5 seconds) after traveling fifty feet.

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	**10.71429**	**1.4**	**11.75**
65	**9.375**	**1.6**	**10.28**
50	**8**	**2.5**	**8.77**
30	**9.433962**	**1.59**	**10.34**
15	**11.53846**	**1.3**	**12.66**
0	**12**	**1**	**13.167**

Table 4.3: Speed calculation of Truck at New Market

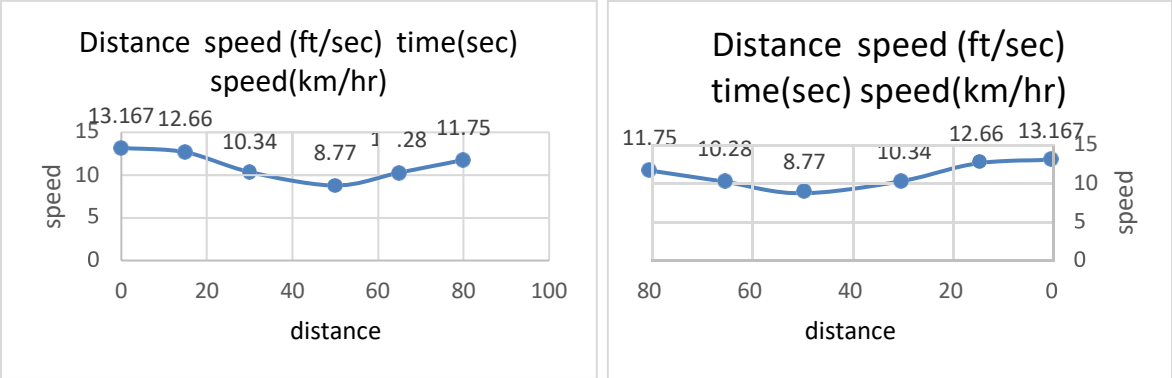


Figure 4.3: Speed graph of truck at New Market to Azimpur

Distance (ft) by speed calculated of truck at New Market in show figure 4.6

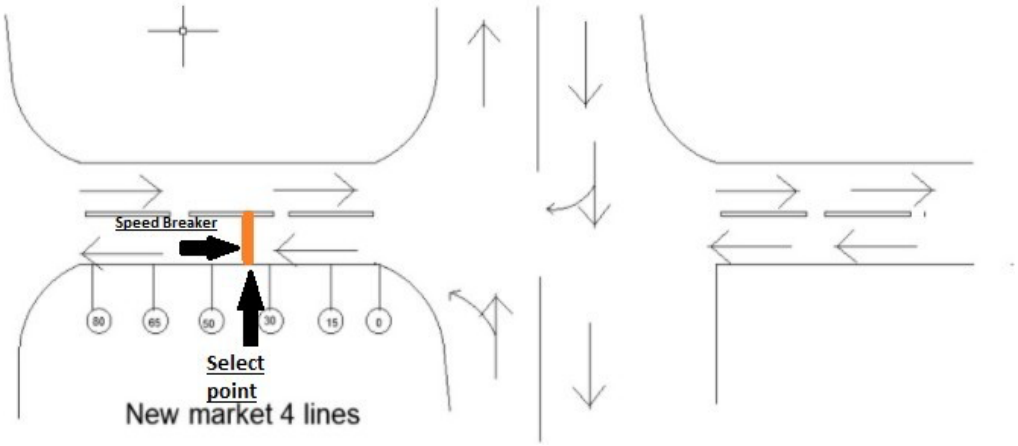
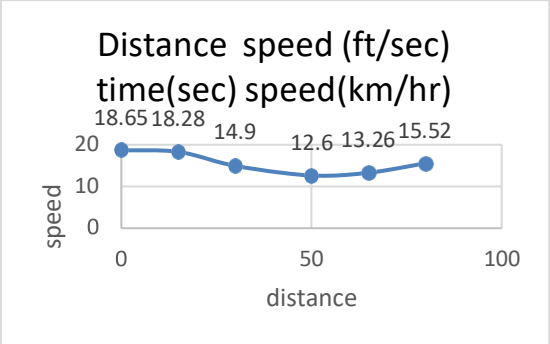


Figure 4.5: Top view of New Market to Azimpur

4.1.3 Speed Analysis of Bike

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	**14.15094**	**1.06**	**15.52**
65	**12.09677**	**1.24**	**13.26**
50	**11.49425**	**1.74**	**12.6**
30	**13.63636**	**1.1**	**14.9**
15	**16.66667**	**0.9**	**18.28**
0	**17**	**0.5**	**18.65**

Calculating the speed breaker distance accounts for 20 feet of the entire 0-80 feet measures, as shown in Table 4.4. The bike positioned on New Market had a maximumspeed of 18.65 kilometers per hour (0.5 second) in 0 feet and a minimum speed of 13.26 kilometers per hour (1.24 seconds) in 50 feet, according to our findings.



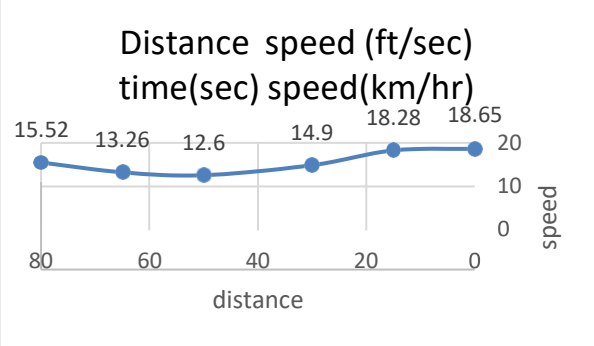
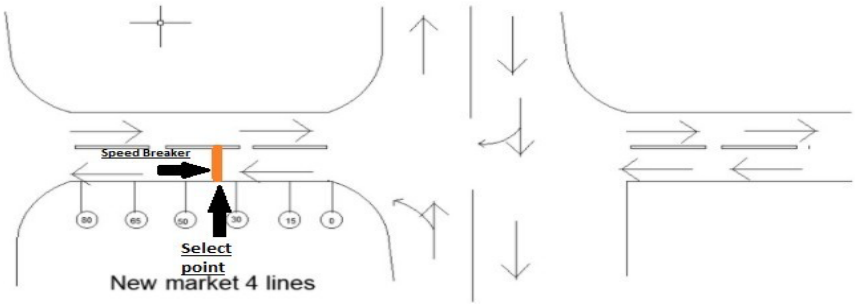


Table 4.4: Speed calculation of bike at New Market Graph: Speed graph of Bike at New Market to Azimpur



4.8: Figure: Top view of New Market to Azimpur Distance (ft) by speed calculated of bike at New Market in show figure

4.1.4 Speed Analysis of Car

20 feet of the total 0-80 feet are measured for determining the speed breaker distance,as shown in Table 4.5. For cars located on New Market, we discovered a maximum speed of 17.55 km/h (0.8 second) in 0 feet and a minimum speed of 11.6 km/h (1.89 seconds) in 50 feet.

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	**13.88889**	**1.08**	**15.23**
65	**11.53846**	**1.3**	**12.65**
50	**10.58201**	**1.89**	**11.6**
30	**10.71429**	**1.4**	**11.75**
15	**15**	**1**	**16.45**
0	**16**	**0.8**	**17.55**

Table 4.5: Speed calculation of car at New Market

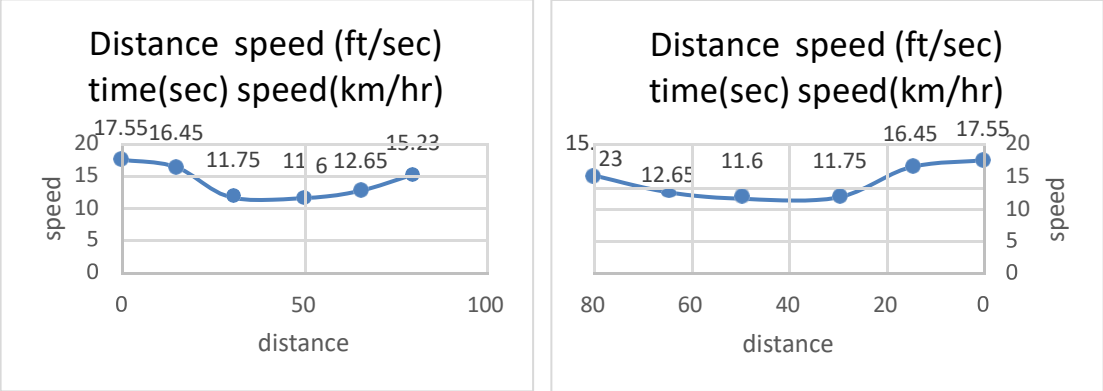


Figure 4.9: Distance (ft) by speed calculated of car at New Market to Azimpur

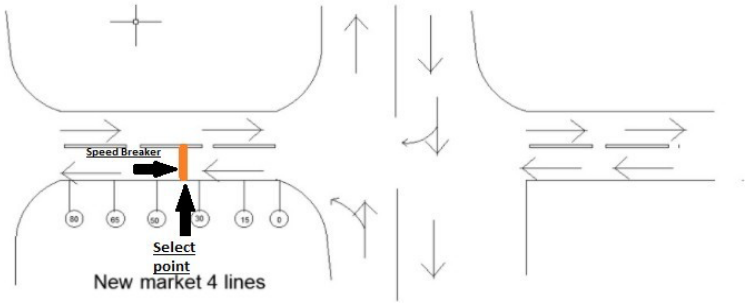
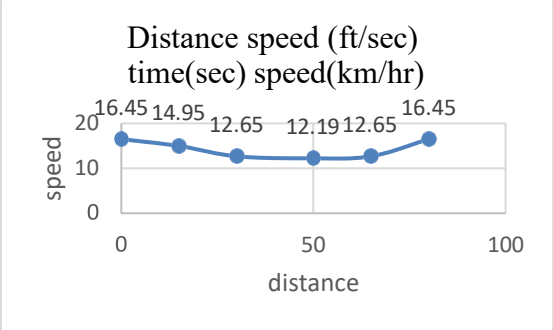


Figure 4.10: Speed graph of car at New Market Figure 4.7: Top view of New Market to Azimpur.

4.1.5 Speed Analysis of CNG

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	15	1	16.45
65	11.53846	1.3	12.65
50	11.11111	1.8	12.19
30	11.53846	1.3	12.65
15	13.63636	1.1	14.95
0	15	1	16.45

According to Table 4.6, calculating speed breaker distance 20 ft. of total 0-80 ft. measures. We discovered that the max speed for CNG is 16.45 km/hr (1 sec) in 0 feetand the min speed limit is 12.19 km/hr. (1.8 sec.) in 50 feet for New Market.



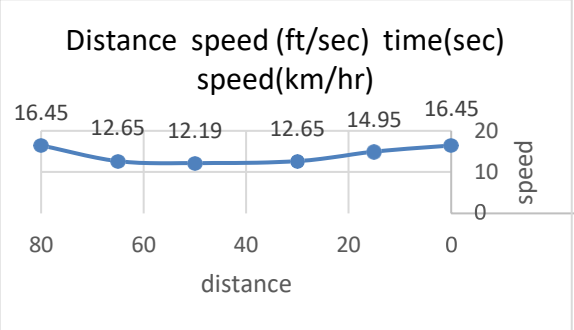


Table 4.6: Speed calculation of CNG at New Market

Distance (ft) by speed calculated of CNG at New Market in show figure 4.12:

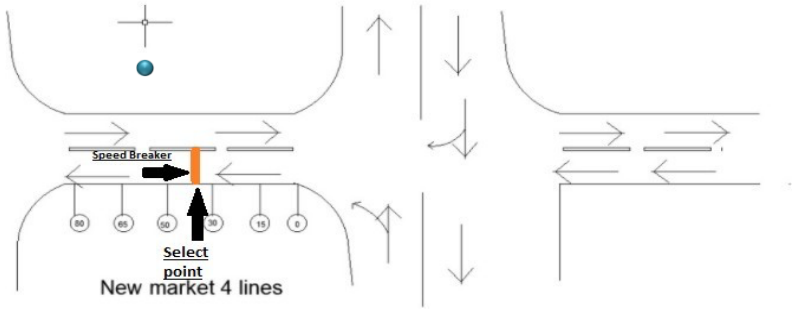


Figure 4.12: Speed graph of CNG at New Market Figure 4.7: Top view of New Market to Azimpur.

4.1.6 Speed Analysis of Rickshaw

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	**8.02139**	**1.87**	**8.88**
65	**7.5**	**2**	**8.22**
50	**7.407407**	**2.7**	**8.11**
30	**7.692308**	**1.95**	**8.43**
15	**8.823529**	**1.7**	**9.74**
0	**10**	**1.4**	**10.97**

Table 4.2 shows that 20 ft of the total 0-80 ft measures are used to figure out the speed breaker distance. We found that the rickshaw on New Market went as fast as 10.97 km/hr (1.4 sec) in 0 feet and as slow as 8.11 km/hr (2.7 sec) in 50 feet.

Table 4.7: Speed calculation of Rickshaw at New Market to Azimpur

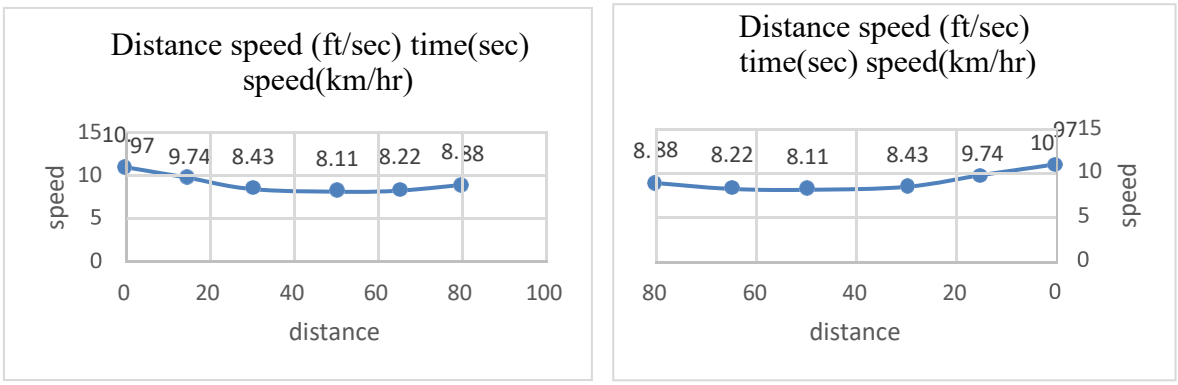


Figure: Distance (ft) by speed calculated of rickshaw at New Market to Azimpur

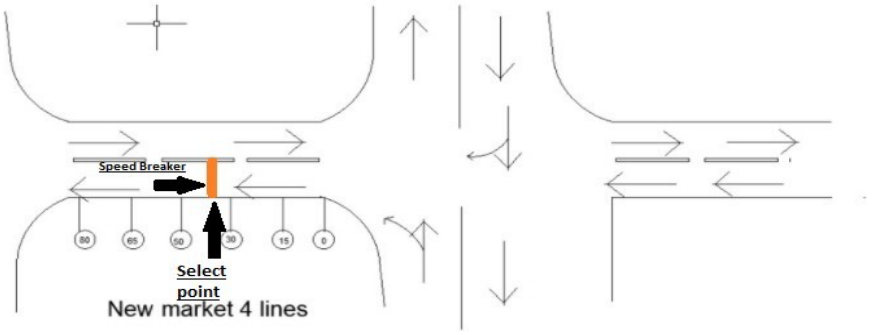


Figure 4.14: Speed graph of rickshaw at New Market Figure 4.13: Top view of New Market to Azimpur.

4.1.1 Speed Analysis of Leguna

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	**14.01869**	**1.07**	**15.38243**
65	**10.71429**	**1.4**	**11.756**
50	**10**	**2**	**10.9728**
30	**10**	**1.5**	**10.9728**
15	**15**	**1**	**16.45**
0	**16**	**0.8**	**17.55**

Table 4.2 shows that 20 ft of the total 0-80 ft measures are used to figure out the speed breaker distance. We found that the rickshaw on New Market went as fast as 15.38 km/hr (1.07 sec) in 0 feet and as slow as 10.97 km/hr (1.5 sec) in 50 feet.

Table 4.8: Speed calculation of Laguna at New Market to Azimpur

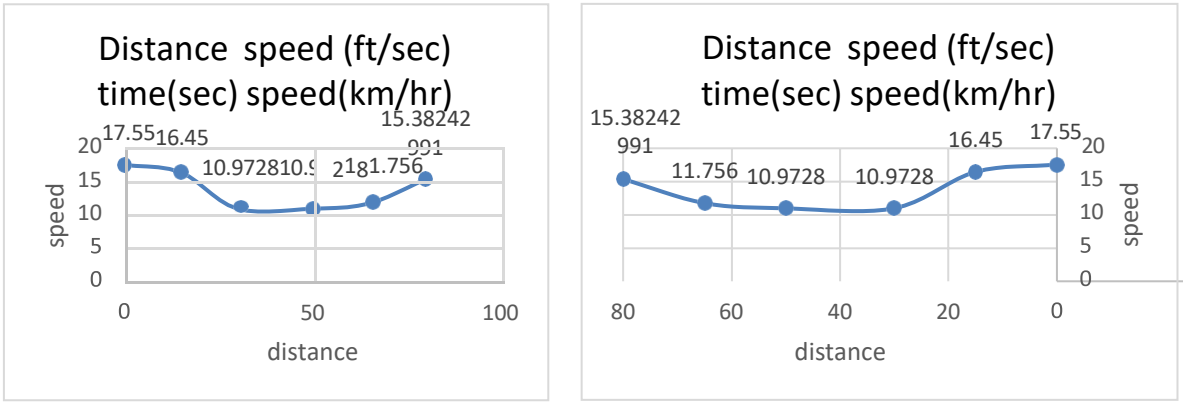


Figure 3.1: Flow chart of study design

Distance (ft) by speed calculated of Laguna at New Market to Azimpur

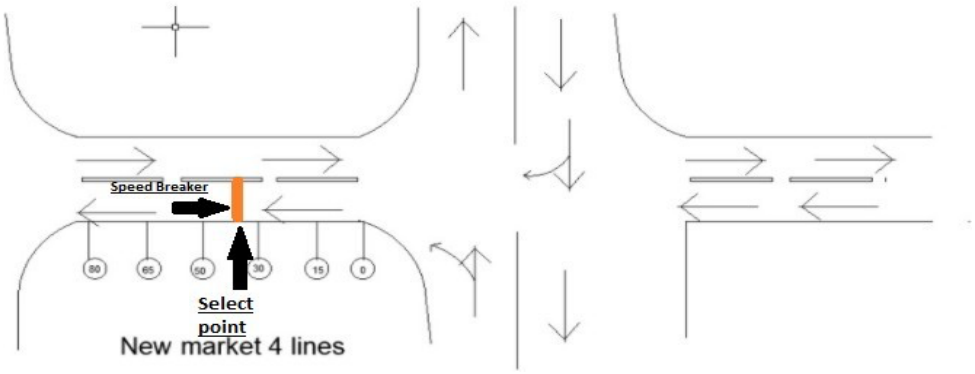


Figure 4.15: Top view of New Market to Azmipur

4.1.1 Speed Analysis of Mini-Truck

Distance	speed (ft/sec)	time(sec)	speed(km/hr)
80	**9.74026**	**1.54**	**10.68**
65	**8.982036**	**1.67**	**9.855**
50	**7.692308**	**2.6**	**8.44**
30	**9.375**	**1.6**	**10.287**
15	**10.71429**	**1.4**	**11.75**
0	**12**	**1**	**13.1674**

Table 4.2 shows that 20 ft of the total 0-80 ft measures are used to figure out the speed breaker distance. We found that the rickshaw on New Market went as fast as 13.16 km/hr (1 sec) in 0 feet and as slow as 8.44 km/hr (2.6 sec) in 50 feet.

Table 4.9: Speed calculation of Mini-Truck at New Market to Azimpur

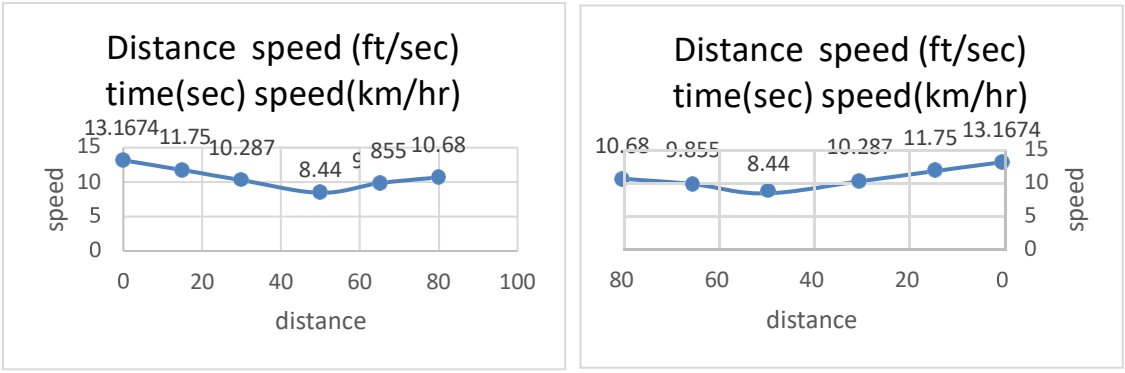


Figure: Distance (ft) by speed calculated of Mini-Truck at New Market to Azimpur

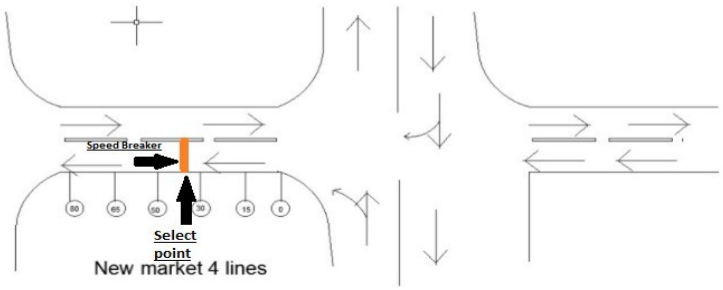


Figure 4.18: Speed graph of Mini-Truck at New Market Figure 4.17: Top view of New Market to Azimpur

4.2 Speed Breakers wise Comparison

Table 4.18 shows that comparatively max average distance 20 feet of New Market. We are compared both are distance identified by vehicle. Slowly time left of rickshaw by the New Market to Azimpur speed breaker is 9.06 Km/Hr and highly movement of bike 15.53 Km/Hr .

Table 4.19: Vehicle wise average calculation of speed breakers

Area Name	Variable	Aver age							
		Bus	Truck	Bike	Car	CNG	Rickshaw	Leguna	Mini truck
New Market	Distance (ft)	20	20	20	20	20	20	20	20
	Speed (Km/Hr)	10.26	11.16	15.53	13.7	14.22	9.06	13.83	10.69

CHAPTER 5: DISCUSSION

5.1 Findings

We reviewed one speed breaker in designated areas of Dhaka city and were able to determine the speed of the vehicles in front of the speed breaker while crossing the speed breaker and aftercrossing the speed breaker. Besides, we have been able to determine how many vehicles are moving every hour and what kind of vehicles are moving at New Market to Azimpur.

5.2 Discussion

We were conducting research on speed profiles at various speed breakers throughout Dhaka. Our investigation concentrated on the area surrounding Azimpur, which included New Marketand Azimpur Road. On Tuesday, September 22, 2022, at 11 am we captured the video by speedbreaker from the side of the New Market. We watched the video at home after recording it andcounted the number of cars and types of vehicles that passed by in an hour. By watching the video at home on Thursday, September 29, 2022 at 1:40 p.m. and recording it from the side of the Azimpur Road speed breaker. we were able to determine the total number of cars and the sorts of vehicles that passed through the breaker in one hour. In addition, we captured the videofrom the speed breaker on the side of Azimpur Road on Thursday, October 2, 2022 at 2:30 p.m.and watched it at home. By recording the video, we were able to determine the total number of cars and the types of vehicles that passed in one hour. We were able to establish the average speed of vehicles by examining the speeds at which vehicles traveled on selected area's speed breaker. The length of the speed breaker on New Market was twenty feet and the average speedof the vehicles was twelve a quarter kilometers per hour; the length of the speed breaker on NewMarket was six feet and the average speed of the vehicles was eight and fourteen kilometers perhour; and the length of the speed breaker on Azimpur was two feet, and the average speed of the vehicles was eleven and ninety-five kilometers per hour.

CHAPTER 6: CONCLUSION

Speed breakers also ease traffic congestion by allowing vehicles to move and flow at a consistent rate. In addition to this, it also reduces pollution caused due to inefficient slowing down and speeding up. It leads to a better road experience for road users. According to the speed profile analysis, three specific locations within Dhaka city had the following characteristics on our thesis: 20 feet on New Market to Eden college road, 13 feet on the New Market to Azimpur Road selected speed breaker; and 31 feet on the Azimpur bus stand location. Vehicles passed throughthe Azimpur speed breaker at an average speed of 11.96 kilometers per hour in 1.12 seconds.New Market to Azimpur our selected zone area speed breaker, the highest speed limit for individual vehicles is 12.25 kilometers per hour, or 1.51seconds. The cumulative effect of this loss turns out to be a speed breaker when you consider thevolume of traffic that uses the road. In light of this work, it is necessary to reevaluate the value that can be gained from installing speed bumps. This work identifies gaps in our knowledge aboutspeed breaks and helps us strategize how to best meet our demands for reducing speed while minimizing the impact on other critical components of the situation. In light of the investigationand the following findings:(Lee et al., 2018)

1. The speed breakers have an effect on the flow of cars for a height of 7.5 in New Market and on the modest speed of commercial vehicles according to the survey. This indicates that when the class of the cars increases, the percentage of speed reduction experienced by vehicles at bump locations will also increase.

2. If the average speeds of vehicles that are supposed to be maintained on a given road are known, a model was devised to find out how high the speed breakers need to be. Field engineers cancreate bump geometry for speed control of vehicles using this helpful tool.

3. Our work identifies gaps in our understanding of speed breakers and assists us in prioritizingmeasures to achieve our speed reduction goals without jeopardizing other, equally important goals. There is a lot of room for creativity in the design of traffic calming devices such as speed humps.

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19. !1sMtUlza3TKx03VaLFSKWSBw!2e0!6shttps:%2F%2Fstreetviewpixels-pa.googleapis.com%2Fv1%2Fthumbnail%3Fpanoid%3DMtUlza3TKx03VaLFSKWSBw%26cb_client%3Dmaps_sv.tactile.gps%26w%3D203%26h%3D100%26yaw%3D

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APPENDIX-I:
EXTERNAL DATA

New Market Part 1: https://maps.app.goo.gl/aYPVyWAx27Jk8YSy8?g_st=ic

New Marketpart 2 : https://maps.app.goo.gl/ey7arWKRNCLNjwe9A?g_st=ic

New Market Part 3: https://maps.app.goo.gl/Kzuh31C8kJZmPG8E8?g_st=ic

New Market part 4: https://maps.app.goo.gl/ub5YDB7VHxzyqzJ57?g_st=ic

Video footages: https://drive.google.com/drive/folders/1DQUc_EGmZwfgYiHscEQIuKR3CbikGxv?usp=sharing