# A representation of dynamic traffic volume analysis for a corridor of Mirpur Road adjacent to Daffodil International University

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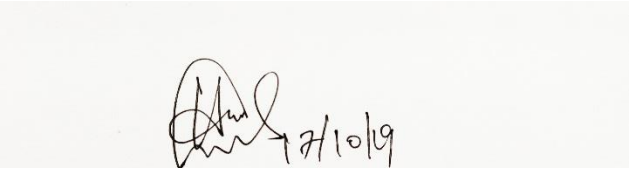
October 12, 2019

# Approval

This thesis titled " **A representation of dynamic traffic volume analysis for a corridor of Mirpur Road adjacent to Daffodil International University** " Submitted by Neaj Morshed (162-47-160), Taj Mohammad Taj (162-47-170), Md. Bayjid Bostame (162-47-190). Session: Summer 2016, has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Bachelor of Science in Civil Engineering on October 12, 2019.

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# Candidate's Declaration

This is hereby declared that this thesis or any part of it has not been submitted elsewhere for the award of any degree.

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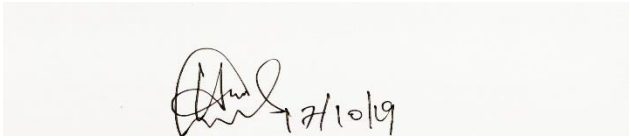


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A project and thesis submitted to the Department of Civil Engineering Daffodil International University, Bangladesh in partial fulfillment of the requirements for the degree of Bachelor of Science (B.Sc.) in Civil Engineering

| | | |
|---|---|---|
| Course Code: | CE 400 | |
| Course Title: | Project and Thesis | |
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| Date: | 12 October, 2019 | |

# Acknowledgements

Thanks to almighty Allah for his graciousness, unlimited kindness and with the blessing of whom the good deeds are fulfilled. I would like to express my deepest sincere gratitude to our supervisor **Dr. Mohammad Hannan Mahmud Khan, Assistant Professor and Associate Head, Department of Civil Engineering, Daffodil International University (DIU)** for giving us a unique opportunity to work on such an important topic. His continuous guidance, invaluable suggestion, affectionate encouragement, generous help and invaluable acumen are greatly acknowledged. His keen interest on the topic and enthusiastic support on my effort was a source of inspiration to carry out of study. I consider myself fortunate to work under his supervision.

Special thanks go to Md. Nafiul Islam Sarkar (163-47-236), Afrose-Al-Raza Hemal (163-47-242), Md. Monirul Islam (163-47-243) and Anwar Hossain (162-47-199) for their help and hard work during the data collection in the study area.

Finally, we would like to express a very special indebtedness to our Father and Mother whose encouragement and support was a continuous source of inspiration for this work.

# Dedications

This thesis dedicated to all of our Parents who inspired us for made this effort possible.

# Abstract

Traffic congestion is a critical concern in most cities. Inefficient traffic control wastes time and fuel and causes harmful carbon emissions, road accidents, and many economic problems. This thesis focuses on a cooperative traffic control framework for optimizing the travel time also for a better uniform traffic Flow in multiple intersections of Mirpur Road. To reach the goal, we firstly select four intersections from Mirpur road. The number of upward and downward vehicles in each intersection will be calculated for three scheduled times of the day. We need to count traffic volume in order to better portrait the congestion scenario. Then we shall transform the count data to PCU (Passenger Car Unit) based on a standard reference. At the same time, each intersection co-ordinate has to be extracted to draw the polygon line using ArcGIS application in order to simulate the traffic volume dynamically over the days of data collection. Finally, we will obtain the simulation output which will help to represent the current traffic situation on the Mirpur road. However, the data count may not be decent enough to portrait the actual situation yet this could be a helpful approach for proceeding towards the digitalization of the traffic count on a real scale. Thus, in future studies this approach can be utilized to determine the procedure for automation of traffic signals as well as implementing state of the art concepts for an alleviated congestion scenario.

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# Chapter-1

# INTRODUCTION

## 1.1. Introduction:

As the number of vehicles grows and the need for mobility increases on a worldwide scale, the frequency and duration of traffic jams in major cities increase. High fuel cost and environmental concerns provide important incentives for minimizing traffic delays. In the short term, the most effective measures to deal with traffic jams seem to be construction of new roads – an option which is often not viable due to lack of space and/or budget, or due to environmental or societal requirements, - and a more efficient use of the existing infrastructure and capacity through advanced traffic management and control. Dynamic traffic control in an urban setup has always been very attractive to traffic engineers and has been around for quite some time now.

Urban arterial roads have great attraction to drivers. However, large numbers of vehicles entering urban arterial roads can cause traffic congestions, even lead to traffic accidents. It is necessary to reduce travel time and the number of stops for vehicles on arterial roads.

The objective is to obtain a smoother flow of traffic on the principal arterial roads. Green wave control is a kind of arterial traffic coordination control method, that coordinates traffic signals of adjacent intersections on arterial road to make vehicles driving by a certain speed meet no or less red lights. In other word, traffic signals of adjacent intersections become green one by one according to a certain time sequence in a direction, like a rolling “green wave”.

## 1.2. Problem Definition:

Dhaka, capital of Bangladesh, is the most densely populated city in the whole world. More than twelve million people live in Dhaka city. Day by day the number is increasing and most part of Dhaka is badly affected by huge traffic jam. Faulty traffic signaling systems, inadequate manpower, narrow road spaces and overtaking tendency of drivers create pro-longed traffic congestions. Due to traffic jam a substantial portion of working hours have to be left on streets which indirectly put adverse impact on economy. It causes serious air pollution and noise pollution and thus worsens the overall environmental condition.

## 1.3. Objectives:

The objectives of the study are as follows:

- Study of heterogeneous traffic.
- Distribution of traffic volume at some intersections.
- Video Simulation of congestion situation over time.

## 1.4. Scope:

The scopes of this research are:

- The main purpose of this research is to analyze the status of congestions over time through video simulation from collected traffic Data.

# Chapter-2

# Literature Review

## 2.1. Introduction:

Millions of people experience traffic congestion daily. In particular, people often become stuck in traffic jams for tens of minutes in contemporary cities, thus wasting considerable time and money. Traffic delay may cause a loss in the health of drivers and a high risk of road accidents. In addition, the environment is affected because vehicles produce a large amount of harmful carbon emissions, causing severe global warming.

## 2.2. Literature Review:

An analysis by NASA revealed that the global surface temperatures in 2012, which caused numerous concerns such as a rise in sea level, decrease in snow cover, and decline in sea-ice extent, were the ninth warmest on record [1]. In addition, the European Commission stated that road transportation contributes to approximately one-fifth of the total CO2 emissions in Europe [2]. Light-duty vehicles (i.e., cars and vans) are the major source producing approximately 15% of CO2 emissions in Europe. In addition to harming humans and the environment, traffic congestion affects the economy. The Toronto Board of Trade stated that economic loss in the Toronto region caused by traffic congestion is $6 billion a year and will increase to $15 billion by 2031 [3]. Therefore, efficient traffic management is urgently required for relieving traffic congestion by enabling vehicles to cross intersections as quickly as possible. The waiting and travel time of drivers and greenhouse gas emissions produced from transportation must be further reduced. Traditional traffic control employs fixed-time signal control and thus cannot dynamically meet current traffic

demands [4]. Traffic congestion is caused when traffic flows differ from typical circumstances. Consequently, adaptive signal control [5], such as split cycle offset optimization technique (SCOOT) [6] and Sydney coordinated adaptive traffic system (SCATS) [7], has been proposed for solving the ineffective control problem by using real-time traffic information to determine how signals should be scheduled. Real-time traffic information is generally collected by dedicated detectors, such as induction loops [8], [9], magnetic sensors, and video cameras [10], [11], to obtain the number of vehicles approaching or exiting an intersection.

Traditional fixed-time traffic control cannot dynamically meet current traffic demands. Here through this research, we can learn about the status of traffic jams of 4 intersection of Mirpur road by making video simulations over time using ArcGIS Application. Based on the result of our exploration we will bring forward some points of consideration to alleviate the current problems for particular intersections.

# Chapter-3

# Methodology

## 3.1. Data Collection:

Several intersections are selected in Dhaka city, for the analysis. The intersections are selected from Mirpur Road. Those intersections are Manik Mian Avenue, Dhanmondi 27, Sukrabad, Dhanmondi 32. We count the traffic volume data for each intersection for 7 days. We calculate the traffic volume for each intersection by dividing it into three spells per day. Spells are from 9am to 11am at Morning Peak, 1pm to 3pm at Afternoon Off Peak and 5pm to 7pm at Afternoon Peak. We used stopwatch, Hand Note, Pen, Mobile camera for this operation. We collect day wise data and intersection wise data. We collect the data and then input it into Microsoft Excel.


Fig 3.1: Landscape of Mirpur Road

Here, Upward Direction: Asadgate → Manik Mian Avenue → Dhanmondi 27 → Sukrabad → Dhanmondi 32.

Downward Direction: Kalabagan → Dhanmondi 32 → Sukrabad → Dhanmondi 27 → Manik Mian Avenue.

| Date | | | UP | | | DOWN | |
|---|---|---|---|---|---|---|---|
| | | CNG | BUS | CAR | CNG | BUS | CAR |
| 4/4/2019 | Peak | 600 | 636 | 2990 | 650 | 580 | 2807 |
| | Off Peak | 445 | 405 | 2408 | 456 | 430 | 2502 |
| | Peak | 595 | 630 | 2670 | 610 | 670 | 2750 |
| 1/7/2019 | Peak | 680 | 539 | 4309 | 615 | 595 | 4078 |
| | Off Peak | 395 | 342 | 3280 | 368 | 318 | 3000 |
| | Peak | 695 | 597 | 4410 | 705 | 480 | 4200 |
| 2/7/2019 | Peak | 650 | 503 | 4300 | 625 | 525 | 4180 |
| | Off Peak | 290 | 323 | 3260 | 270 | 298 | 3100 |
| | Peak | 615 | 517 | 4490 | 580 | 500 | 4180 |
| 3/7/2019 | Peak | 690 | 580 | 4400 | 670 | 555 | 4200 |
| | Off Peak | 395 | 396 | 3159 | 360 | 290 | 2989 |
| | Peak | 680 | 585 | 4295 | 550 | 565 | 4309 |
| 4/7/2019 | Peak | 710 | 800 | 4309 | 690 | 710 | 4039 |
| | Off Peak | 340 | 380 | 2988 | 360 | 335 | 3096 |
| | Peak | 695 | 780 | 4340 | 660 | 696 | 4160 |
| 5/7/2019 | Peak | 680 | 580 | 4410 | 630 | 490 | 4297 |
| | Off Peak | 405 | 310 | 3067 | 380 | 300 | 3010 |
| | Peak | 606 | 630 | 4380 | 610 | 640 | 4290 |
| 6/7/2019 | Peak | 710 | 639 | 4207 | 680 | 591 | 4088 |
| | Off Peak | 480 | 393 | 2953 | 409 | 402 | 2809 |
| | Peak | 690 | 660 | 4308 | 650 | 610 | 4287 |

Table 3.1: Traffic Volume/2hr Data (Manik Mian Avenue)

| Date | | | UP | | | DOWN | |
|---|---|---|---|---|---|---|---|
| | | CNG | BUS | CAR | CNG | BUS | CAR |
| 21/3/2019 | Peak | 848 | 460 | 4272 | 657 | 377 | 3163 |
| | Off Peak | 530 | 420 | 3500 | 375 | 165 | 2859 |
| | Peak | 778 | 341 | 3965 | 497 | 376 | 2563 |
| 24/3/2019 | Peak | 432 | 533 | 2110 | 450 | 439 | 2349 |
| | Off Peak | 390 | 378 | 1888 | 298 | 467 | 1678 |
| | Peak | 600 | 609 | 2155 | 562 | 677 | 2353 |
| 19/8/2019 | Peak | 775 | 539 | 4500 | 710 | 520 | 4410 |
| | Off Peak | 410 | 300 | 3089 | 390 | 280 | 3120 |
| | Peak | 850 | 490 | 4297 | 760 | 440 | 4002 |
| 2/9/2019 | Peak | 688 | 505 | 5009 | 540 | 445 | 4107 |
| | Off Peak | 410 | 317 | 3027 | 400 | 309 | 2908 |
| | Peak | 539 | 500 | 4500 | 490 | 447 | 4290 |
| 3/9/2019 | Peak | 580 | 495 | 4825 | 490 | 450 | 4620 |
| | Off Peak | 360 | 319 | 3015 | 310 | 300 | 2910 |
| | Peak | 610 | 500 | 4985 | 600 | 520 | 4895 |
| 4/9/2019 | Peak | 790 | 660 | 4190 | 450 | 550 | 4000 |
| | Off Peak | 367 | 309 | 2003 | 301 | 267 | 1958 |
| | Peak | 780 | 589 | 4280 | 728 | 548 | 4002 |
| 5/9/2019 | Peak | 690 | 560 | 4400 | 650 | 510 | 4238 |
| | Off Peak | 340 | 240 | 2017 | 300 | 290 | 2170 |
| | Peak | 730 | 609 | 3910 | 748 | 680 | 3875 |

Table 3.2: Traffic Volume/2hr Data (Dhanmondi 27 Intersection)

| Date | | | UP | | | DOWN | |
|---|---|---|---|---|---|---|---|
| | | CNG | BUS | CAR | CNG | BUS | CAR |
| 24/3/2019 | Peak | 639 | 535 | 2709 | 340 | 334 | 2525 |
| | Off Peak | 308 | 235 | 1336 | 255 | 302 | 1555 |
| | Peak | 228 | 378 | 2513 | 274 | 406 | 2680 |
| 4/4/2019 | Peak | 580 | 530 | 2510 | 438 | 322 | 2713 |
| | Off Peak | 300 | 230 | 1150 | 255 | 300 | 1430 |
| | Peak | 210 | 375 | 2420 | 265 | 400 | 2500 |
| 19/8/2019 | Peak | 660 | 560 | 3040 | 380 | 250 | 1880 |
| | Off Peak | 360 | 270 | 2009 | 390 | 240 | 1500 |
| | Peak | 445 | 415 | 2155 | 595 | 370 | 2875 |
| 2/9/2019 | Peak | 680 | 520 | 3895 | 350 | 314 | 3798 |
| | Off Peak | 310 | 235 | 3001 | 255 | 202 | 2750 |
| | Peak | 270 | 443 | 4010 | 360 | 351 | 2603 |
| 3/9/2019 | Peak | 650 | 540 | 3783 | 393 | 278 | 2480 |
| | Off Peak | 327 | 233 | 2719 | 271 | 267 | 2603 |
| | Peak | 463 | 388 | 3680 | 437 | 334 | 3910 |
| 4/9/2019 | Peak | 785 | 630 | 4195 | 445 | 525 | 3991 |
| | Off Peak | 339 | 300 | 2001 | 290 | 254 | 1950 |
| | Peak | 750 | 575 | 4293 | 704 | 532 | 4093 |
| 5/9/2019 | Peak | 690 | 547 | 4398 | 640 | 500 | 4236 |
| | Off Peak | 328 | 230 | 2007 | 288 | 278 | 2161 |
| | Peak | 715 | 595 | 3898 | 735 | 670 | 3869 |

Table 3.3: Traffic Volume/2hr Data (Sukrabad Intersection)

| Date | | | UP | | | DOWN | |
|---|---|---|---|---|---|---|---|
| | | CNG | BUS | CAR | CNG | BUS | CAR |
| 21/3/2019 | Peak | 719 | 575 | 3032 | 310 | 280 | 1870 |
| | Off Peak | 323 | 300 | 1997 | 314 | 239 | 1004 |
| | Peak | 462 | 415 | 2310 | 596 | 376 | 2848 |
| 24/3/2019 | Peak | 648 | 540 | 2753 | 350 | 337 | 2539 |
| | Off Peak | 312 | 239 | 1342 | 263 | 309 | 1560 |
| | Peak | 229 | 386 | 2518 | 278 | 414 | 2688 |
| 19/8/2019 | Peak | 670 | 560 | 3120 | 400 | 250 | 1920 |
| | Off Peak | 360 | 270 | 2090 | 390 | 240 | 1540 |
| | Peak | 450 | 420 | 2200 | 600 | 379 | 2930 |
| 2/9/2019 | Peak | 700 | 535 | 3980 | 390 | 533 | 3885 |
| | Off Peak | 318 | 247 | 3085 | 263 | 210 | 2839 |
| | Peak | 500 | 459 | 4178 | 390 | 365 | 2653 |
| 3/9/2019 | Peak | 695 | 570 | 3809 | 407 | 300 | 2509 |
| | Off Peak | 340 | 250 | 2800 | 295 | 285 | 2653 |
| | Peak | 500 | 405 | 3707 | 450 | 355 | 3990 |
| 4/9/2019 | Peak | 800 | 660 | 4207 | 460 | 550 | 4003 |
| | Off Peak | 367 | 309 | 2012 | 303 | 267 | 1978 |
| | Peak | 780 | 589 | 4307 | 730 | 548 | 4111 |
| 5/9/2019 | Peak | 695 | 560 | 4409 | 650 | 510 | 4240 |
| | Off Peak | 340 | 240 | 2019 | 300 | 290 | 2170 |
| | Peak | 730 | 609 | 3910 | 750 | 680 | 3880 |

Table 3.4: Traffic Volume/2hr Data (Dhanmondi 32 Intersection)

## 3.2. Uniform Traffic Count:

We calculate PCU from the traffic volume data. For Car we used the factor 1, for CNG we used the factor 1, for Bus we used the factor 3. Then we multiply the hourly peak, off peak vehicle with the PCU factor and calculate the PCU/hr for each spell for Car, CNG and Bus.

## 3.3. Uses of ArcGIS:

Later we use the ArcGIS application. We work on three links between the four intersections we surveyed. In the four intersections we analyzed, we extracted the coordinates using Google Maps. Then, we find out the Dhaka Divisional Map from Google Map and **Georeferencing** by ArcGIS Application. We create a SHP file of Dhaka City Map Using ArcGIS application. Then we put the Map of Dhaka city inside the SHP file that we create in ArcGIS. After that we draw a polygon line over the 4 intersections using the intersection coordinates by importing XY data in ArcGIS Application. We Draw 2 Polygon line over the intersection. One Polygon line for upward direction and another one downward direction. For Downward polygon line we reverse the coordinate XY data.

| Line | X Start | Y Start | X End | Y End |
|---|---|---|---|---|
| 1 | 90.374306 | 23.758222 | 90.374889 | 23.757083 |
| 2 | 90.374889 | 23.757083 | 90.377 | 23.752 |
| 3 | 90.377 | 23.752 | 90.377 | 23.752 |

Table 3.5: XY Coordinate of Upward Direction

| Line | X Start | Y Start | X End | Y End |
|---|---|---|---|---|
| 1 | 90.3746060 | 23.758222 | 90.375099 | 23.757083 |
| 2 | 90.375099 | 23.757083 | 90.3773 | 23.7521 |
| 3 | 90.3773 | 23.7521 | 90.3773 | 23.7521 |

Table 3.6: XY Coordinate of Downward Direction

## 3.4. Polygon line Drawing Step:

Step 01:

Add Data

→ Select the Excel File.

Step 02:

Catalog

→ System Toolboxes

→ Data Management Tools

→ Features

→ XY to line.

Step 03:

Input Line (Here, Select the Excel File)

→ Start X Field (Here, Select X Start)

→ Start Y Field (Here, Select Y Start)

→ End X Field (Here, Select X End)

→End Y Field (Here, Select Y End)

→ Line Type (Here, Select RHUMB_LINE)

→ Spatial Reference Properties (Here, Select Asia → Everest – Bangladesh)

→ Ok

Then the ArcGIS Application output that:

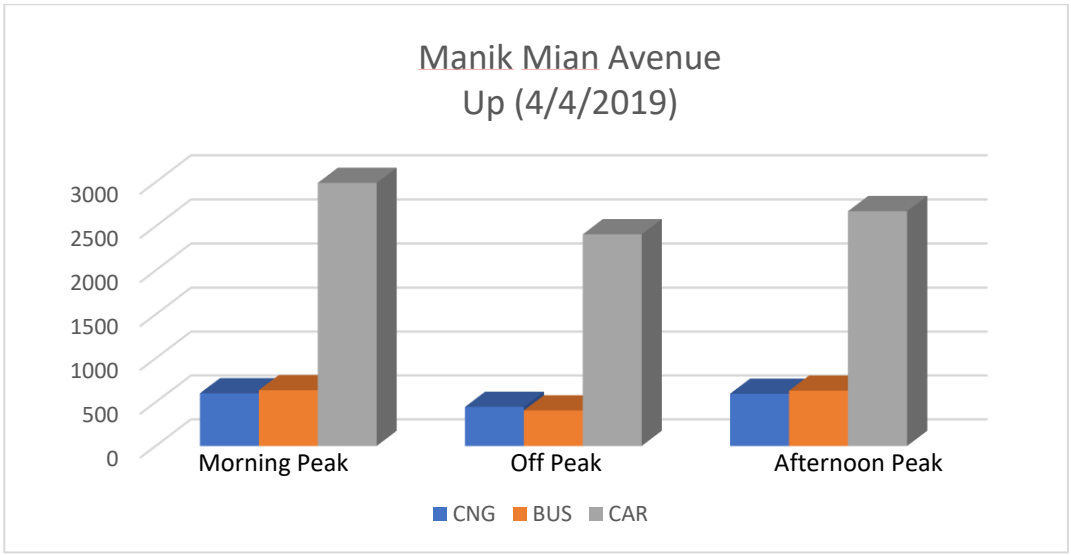

Fig 3.2: Polygon Line Upward and Downward Direction

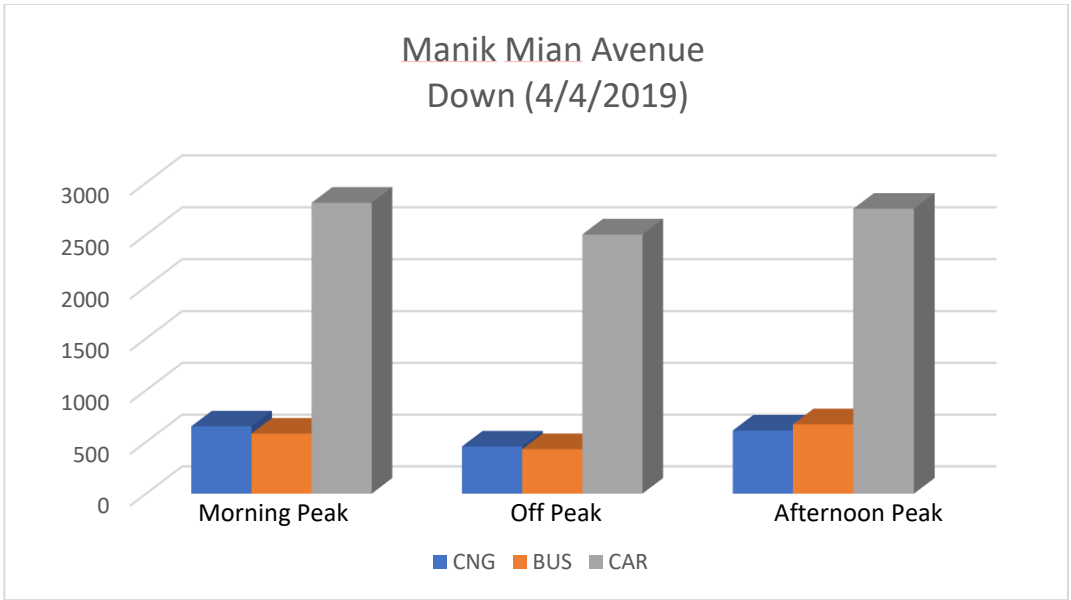
# Chapter-4

# Data Analysis and Result

## 4.1. Data Analysis:

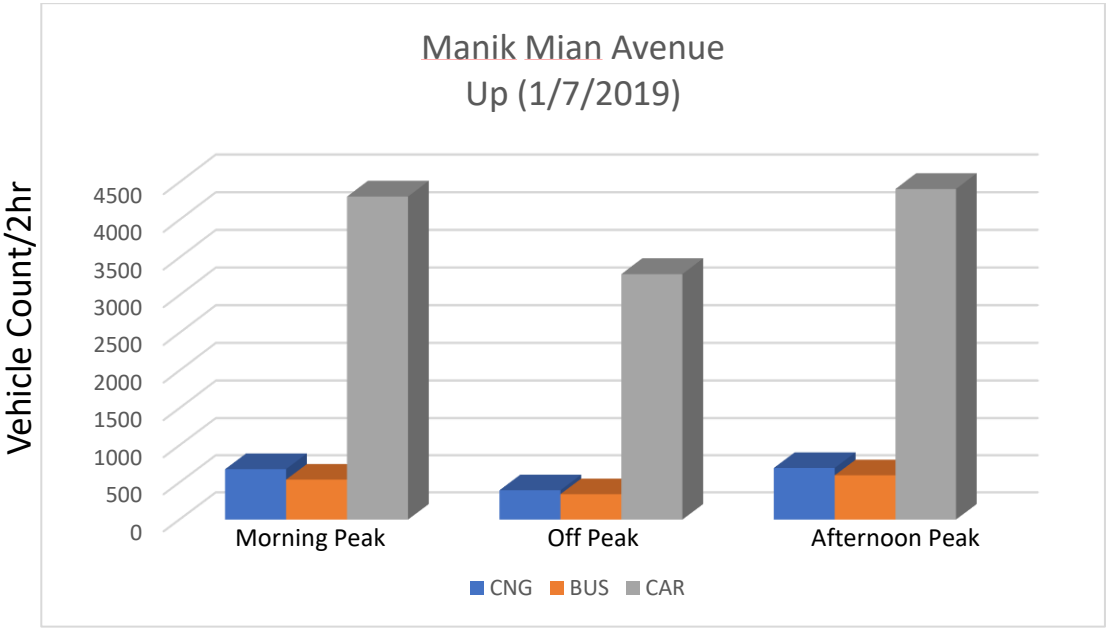
In our data collection time, we count CNG, Bus and Car for 2 hours in a spell. The vehicle count bar chart for each intersection in morning peak, off peak and afternoon peak are below:

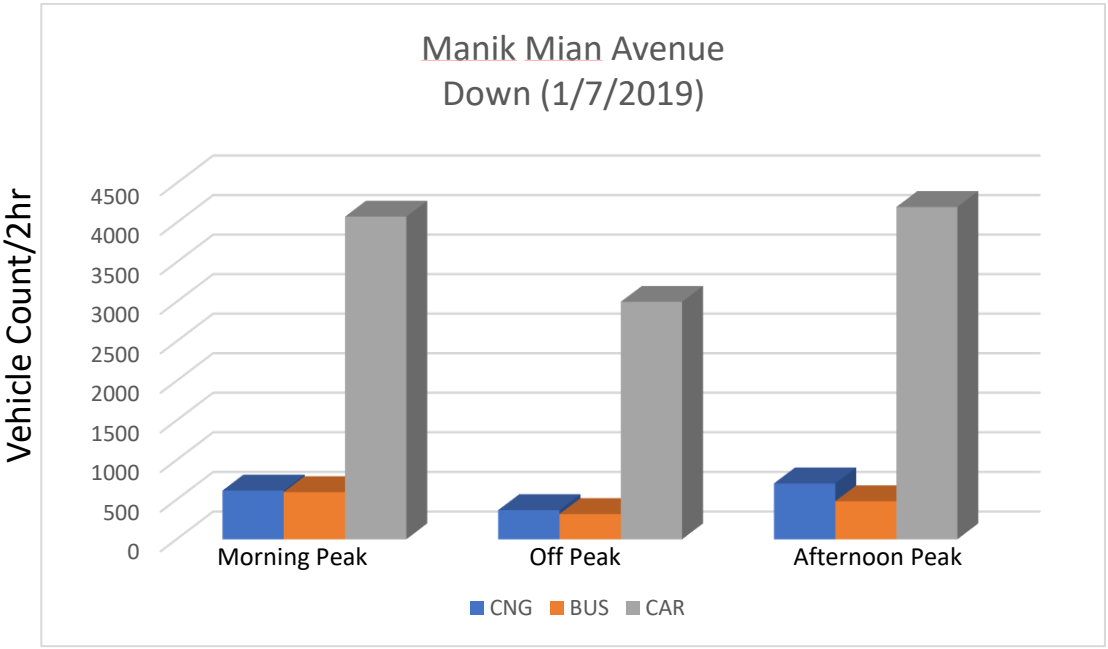


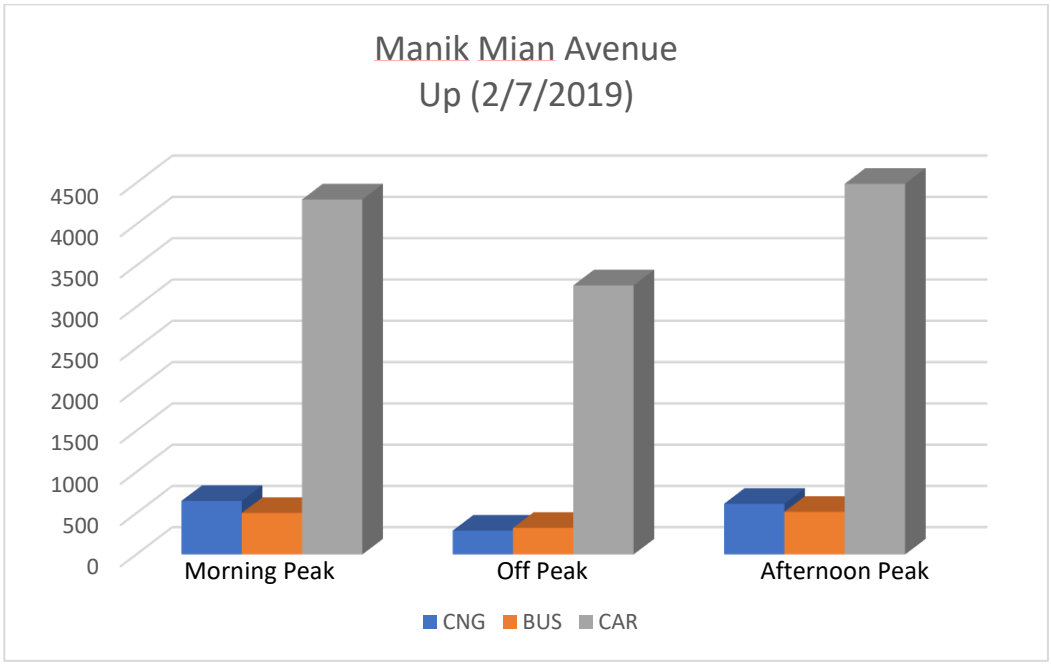

We can see that, in 4/4/2019 the number of CNGs in Downward is higher in the morning peak on Manik Mian Avenue, and the number of CNGs in upward is lower but the number of buses and car of upward and downward is almost

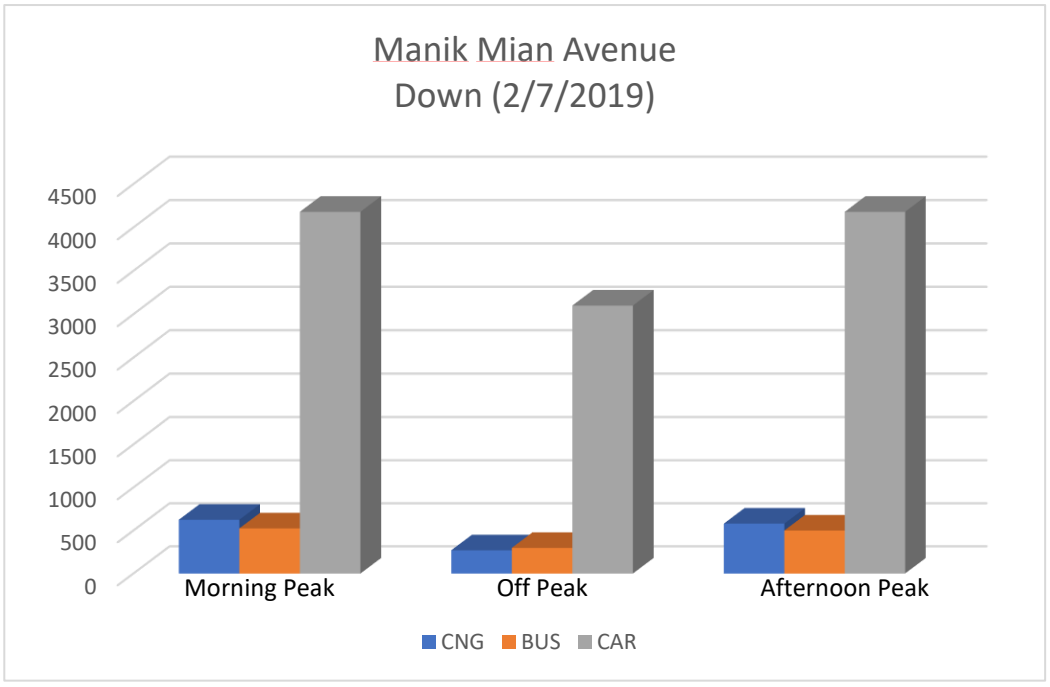
equal. On the other hand, the number of CNG, buses and cars are almost equal during off peak and afternoon peak.



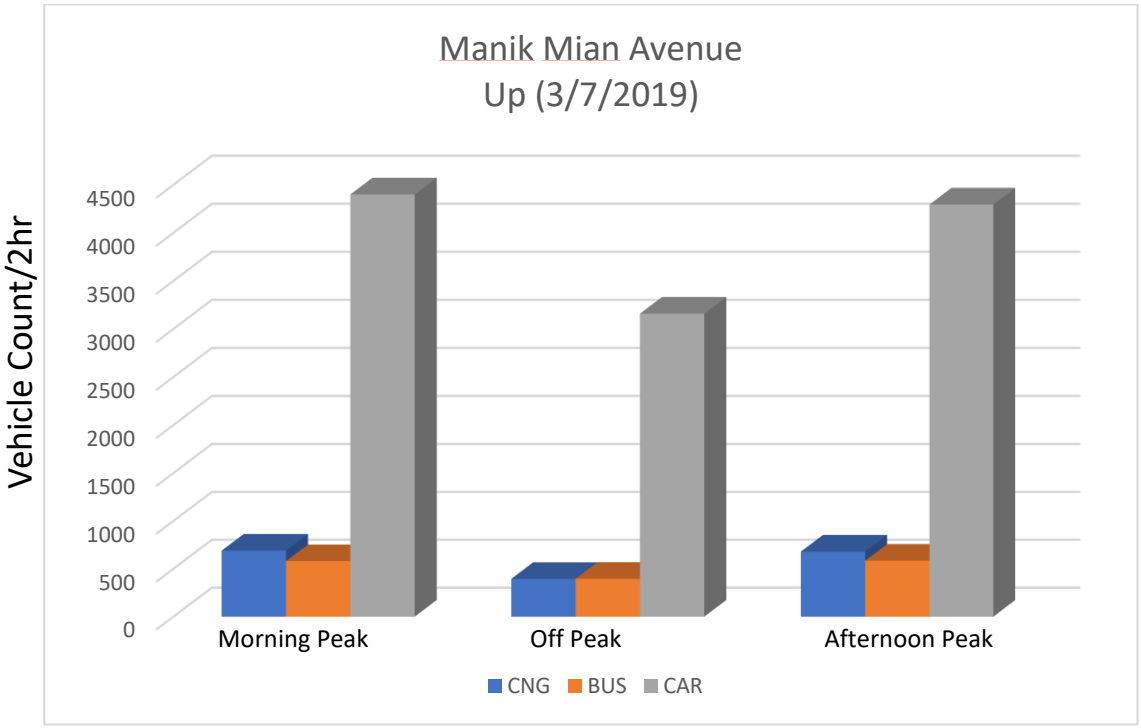



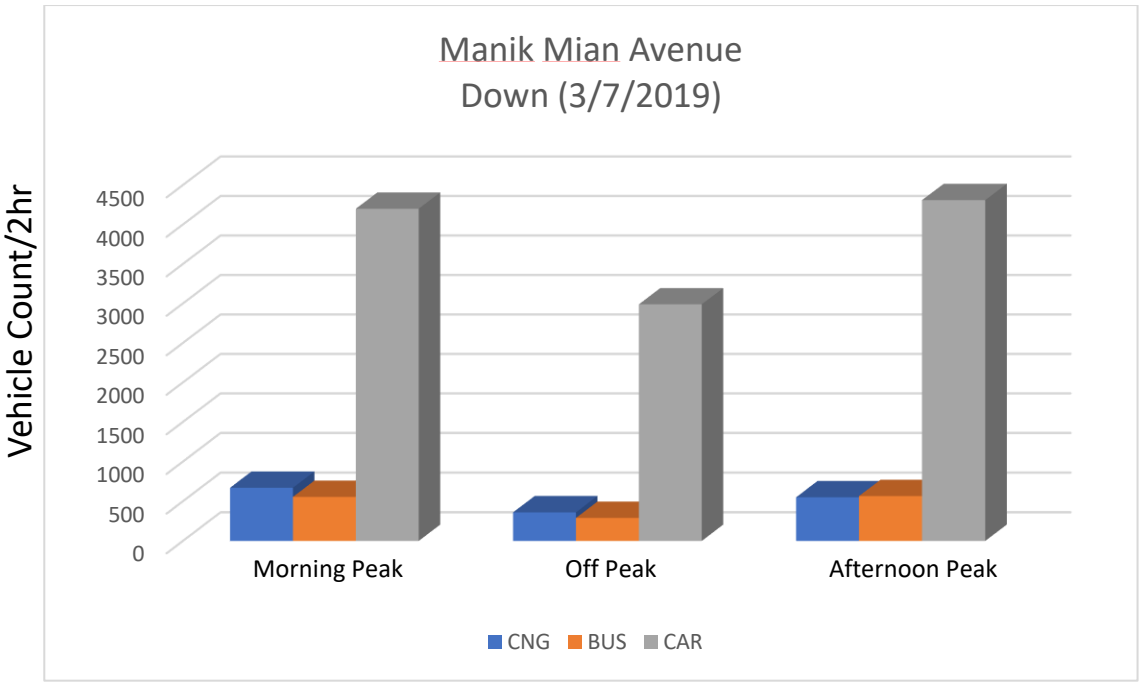

On the 1/7/2019, we can see that the number of CNGs in the morning peak is higher but the downward is less and the number of cars in the upward is higher and but all other quantities are almost equal.



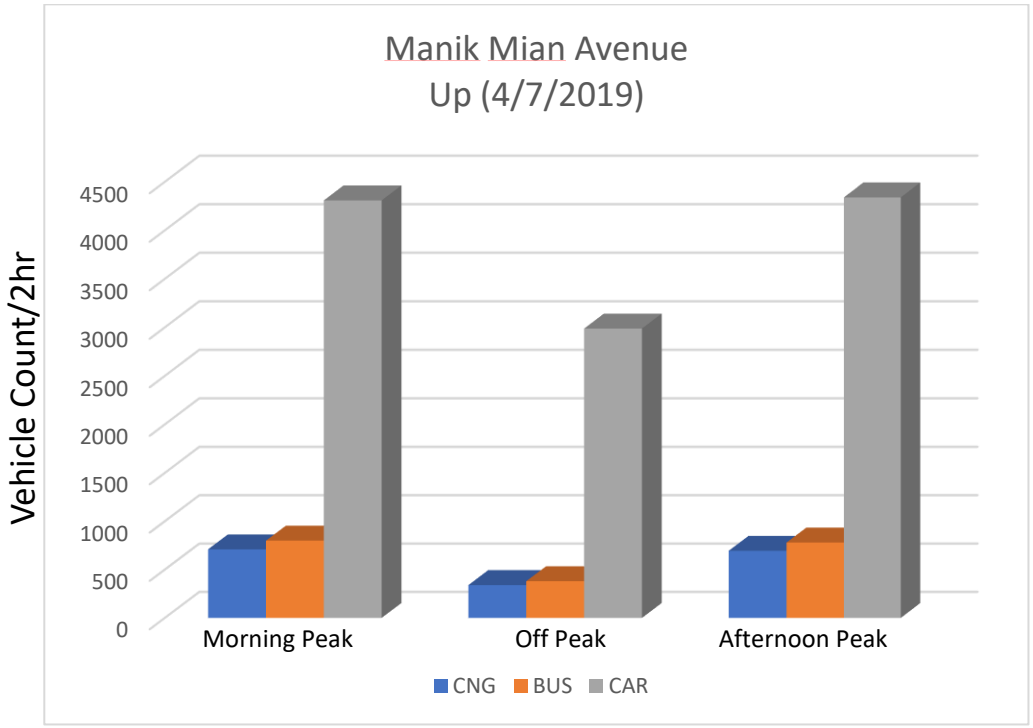



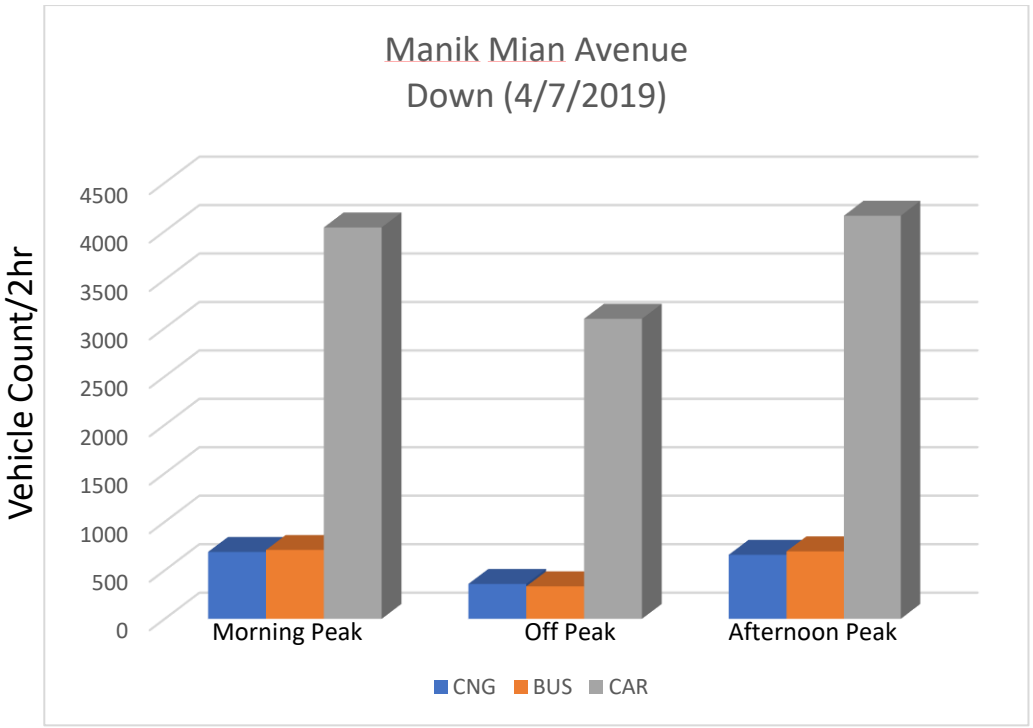

On the 2/7/2019, we can see that the number of cars in upward afternoon peak is higher than downward afternoon peak.



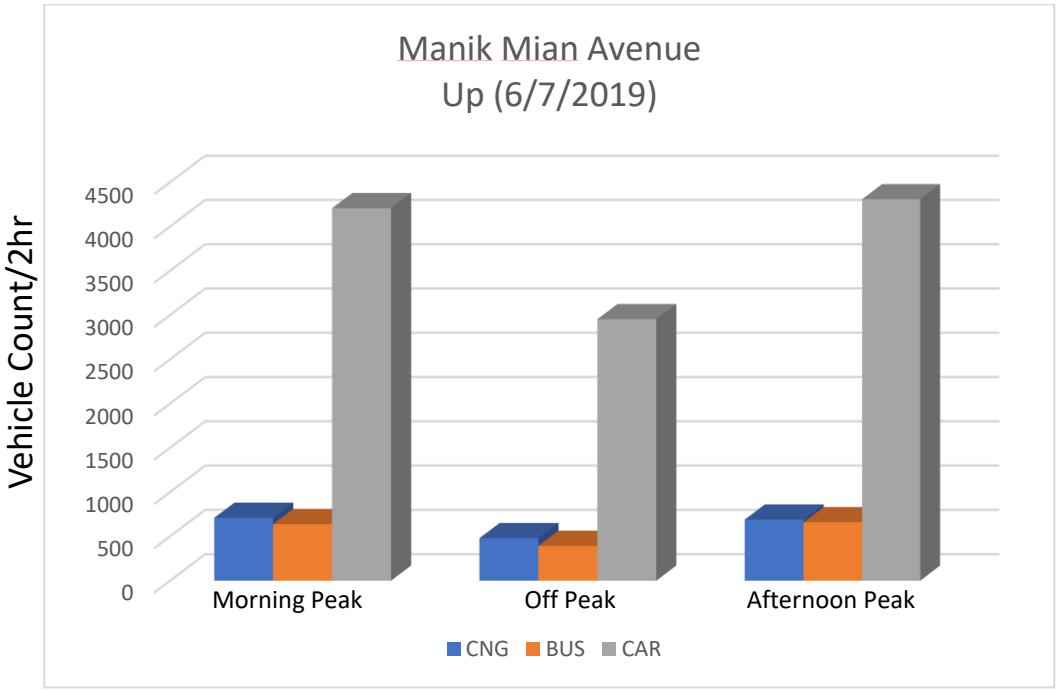



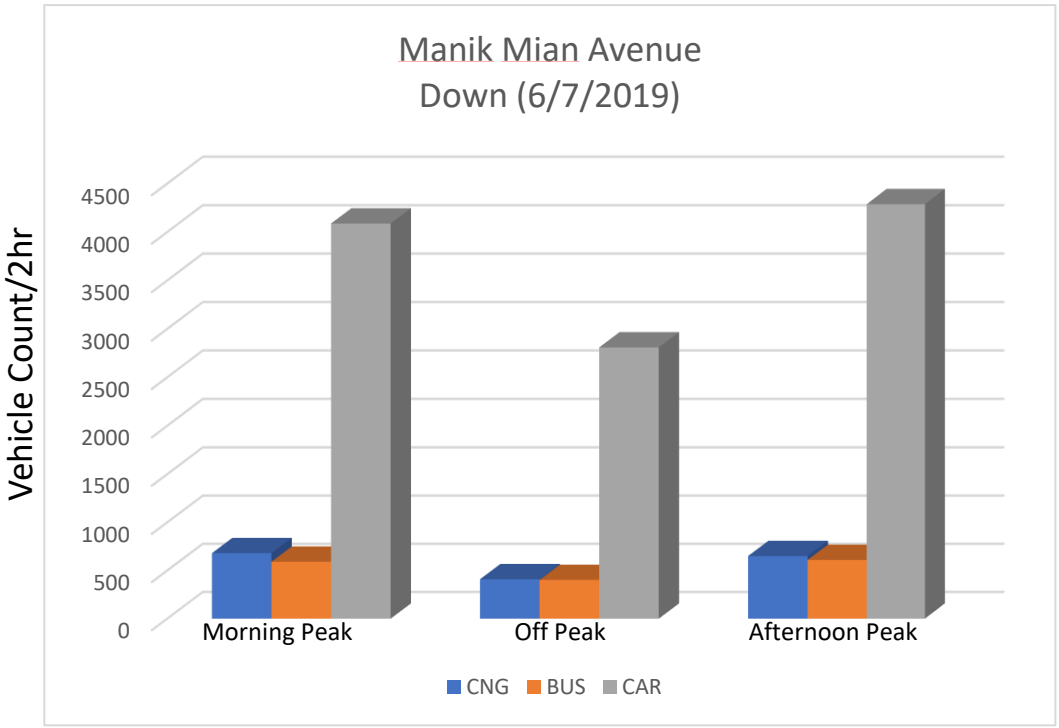

On the 3/7/2019, we can see that the number of cars in upward is higher than downward.



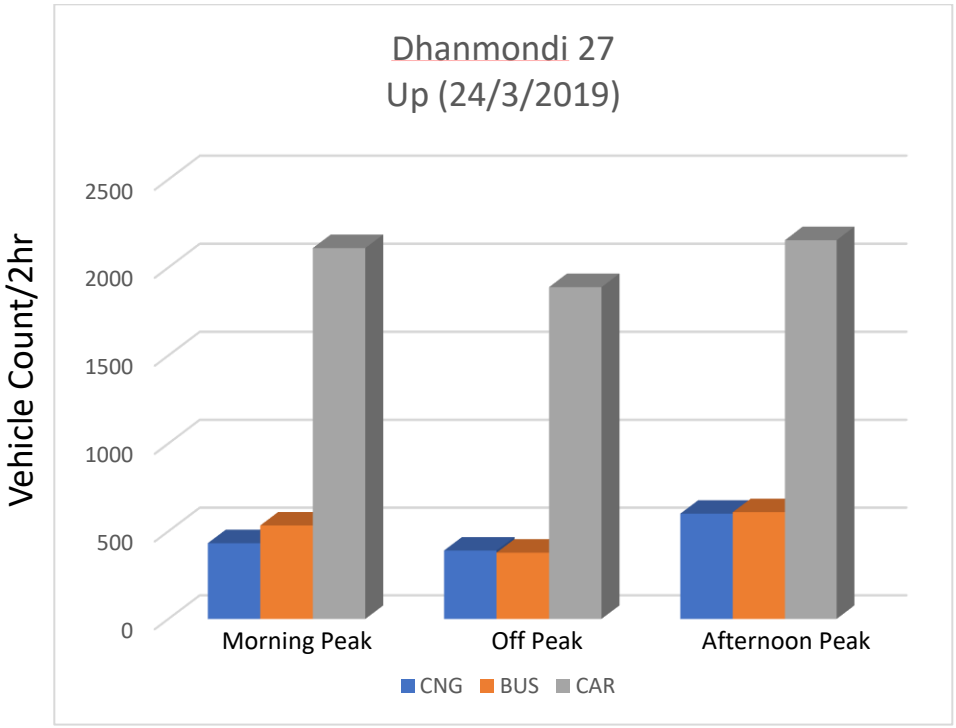



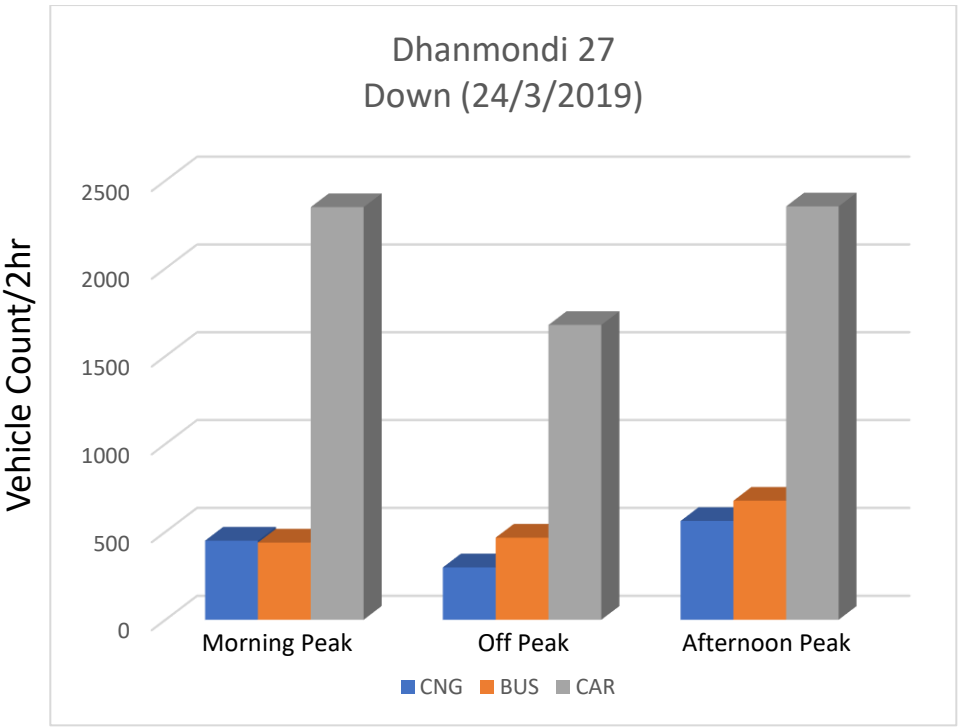

On the 4/7/2019, the number of cars in upward is less than downward at off peak and the number of buses at morning peak and afternoon peak is higher downward.



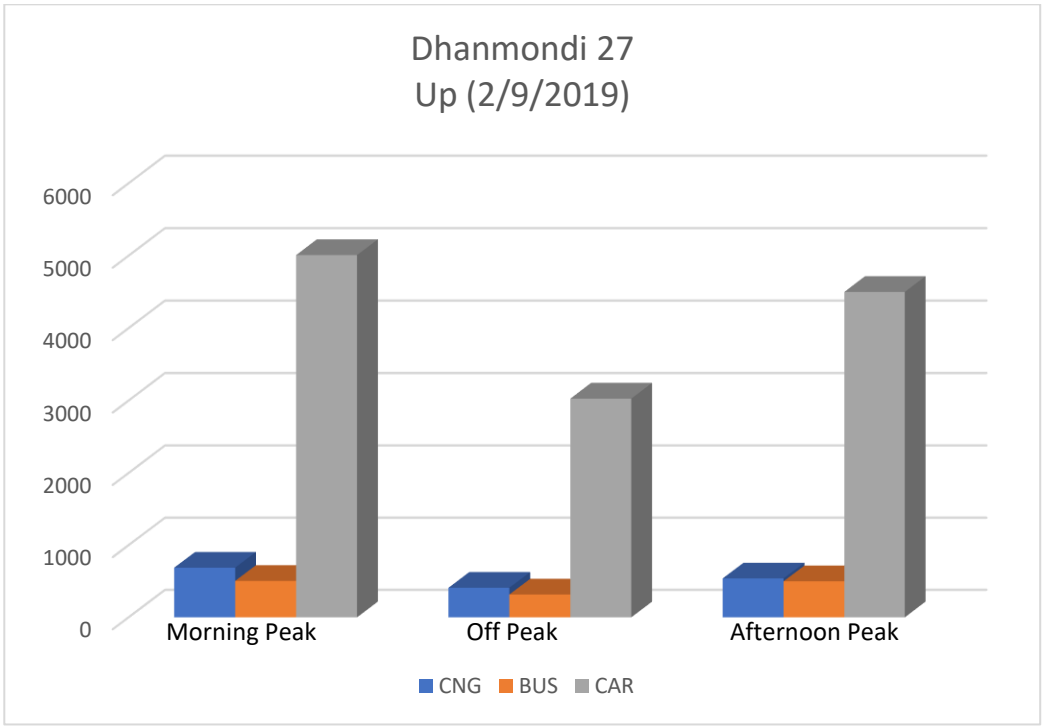



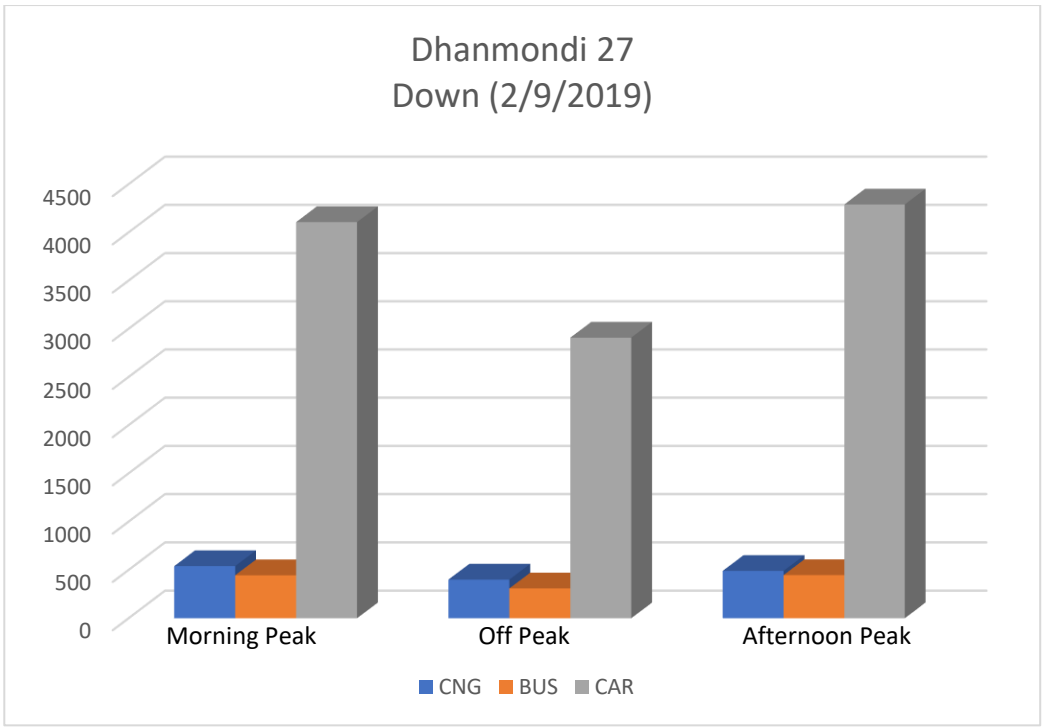

On the 6/7/2019, the number of CNGs and cars are little bit higher at upward than downward on off peak.



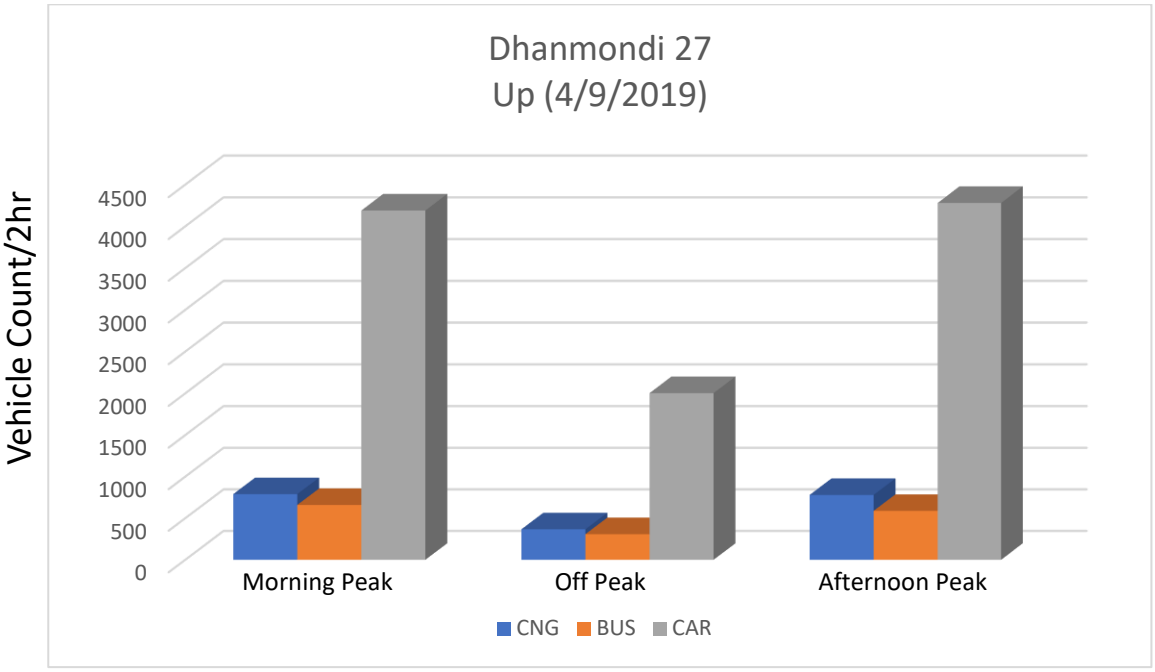



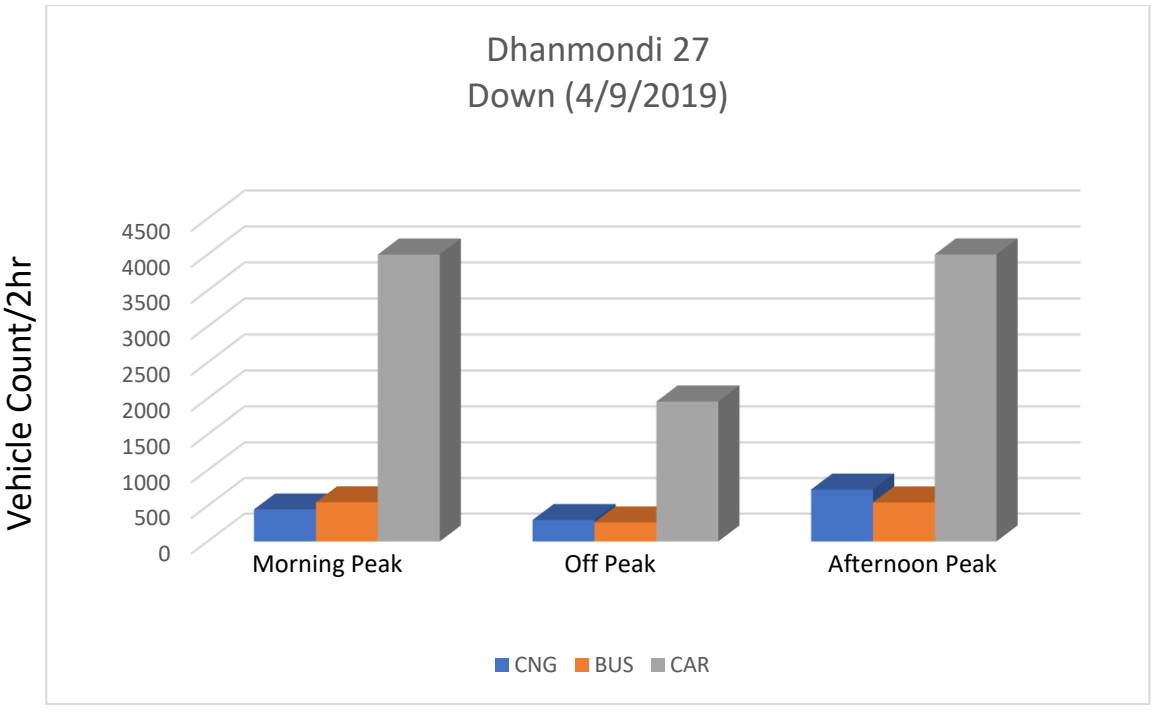

On the 24/3/2019, the number of buses and cars are higher than downward on morning peak. And the other hand the number of CNGs and cars are less then upward at off peak. Also, in the afternoon peak, the number of buses and cars are higher than upward.



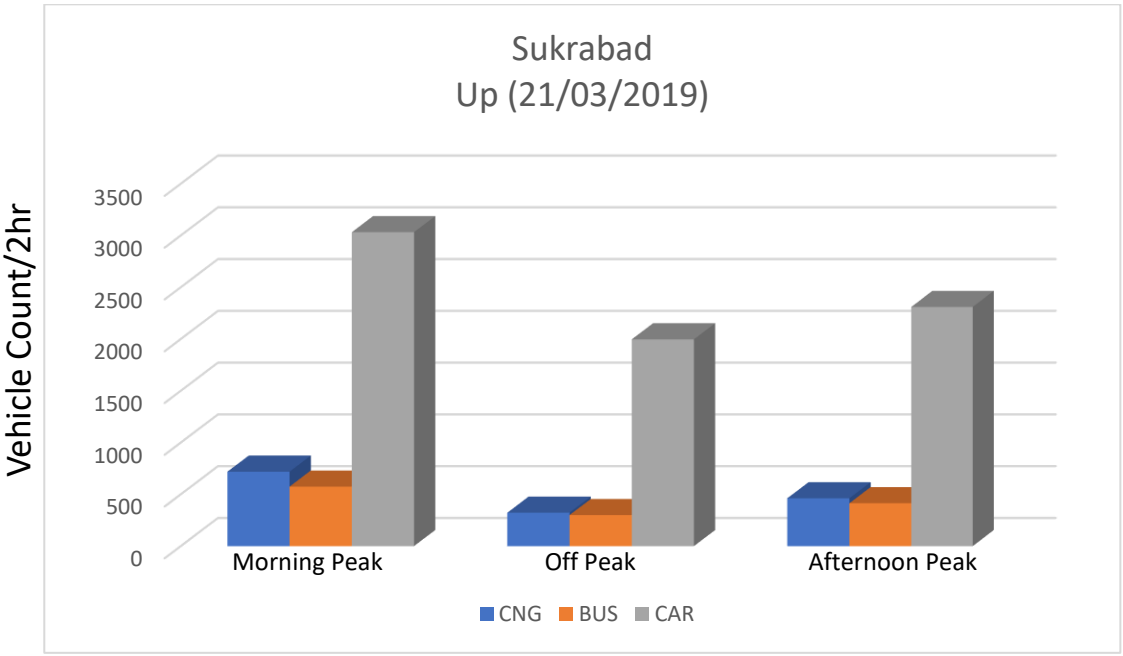



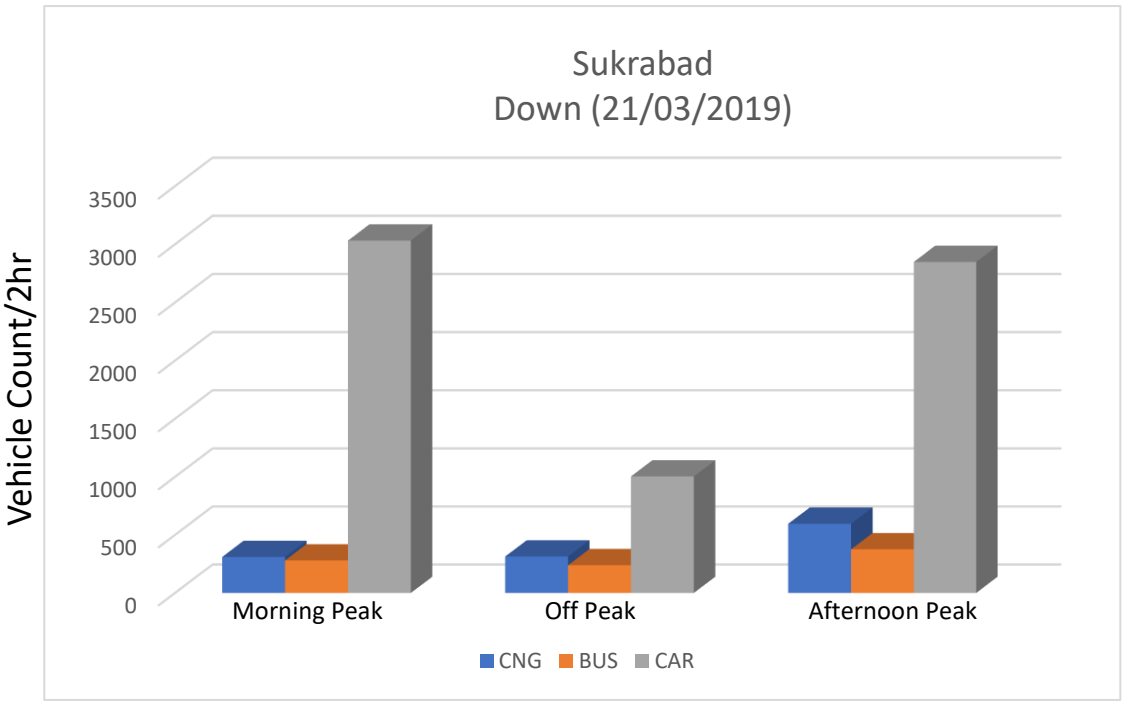

On the 2/9/2019, the number of cars is higher than downward at afternoon peak.



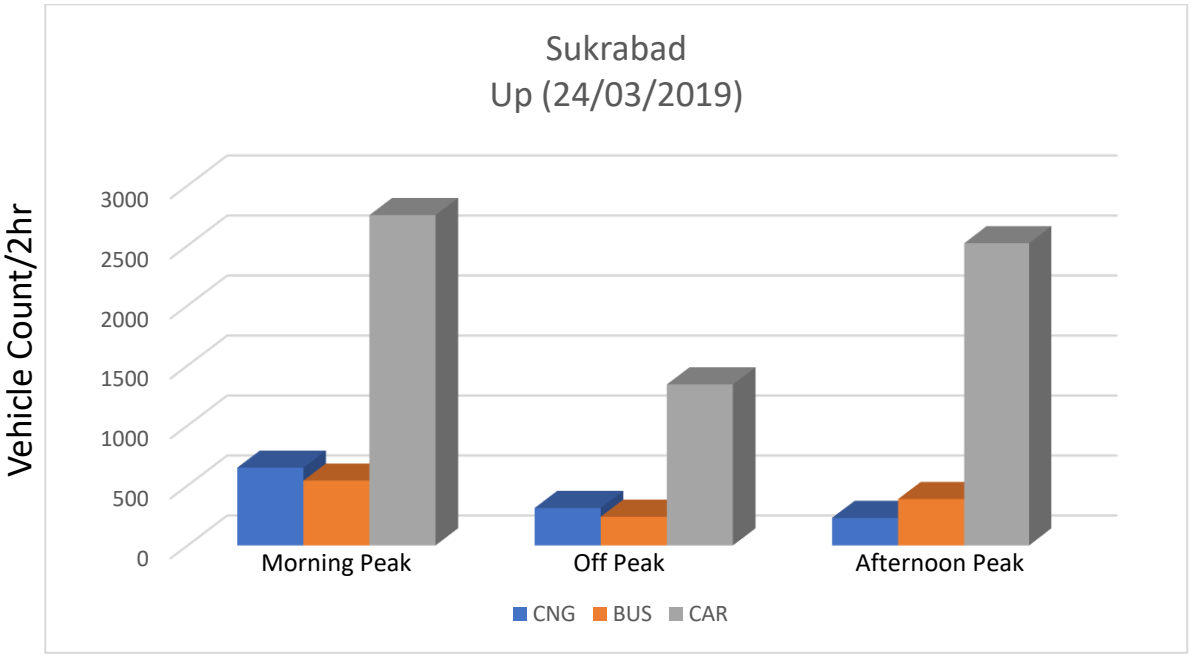



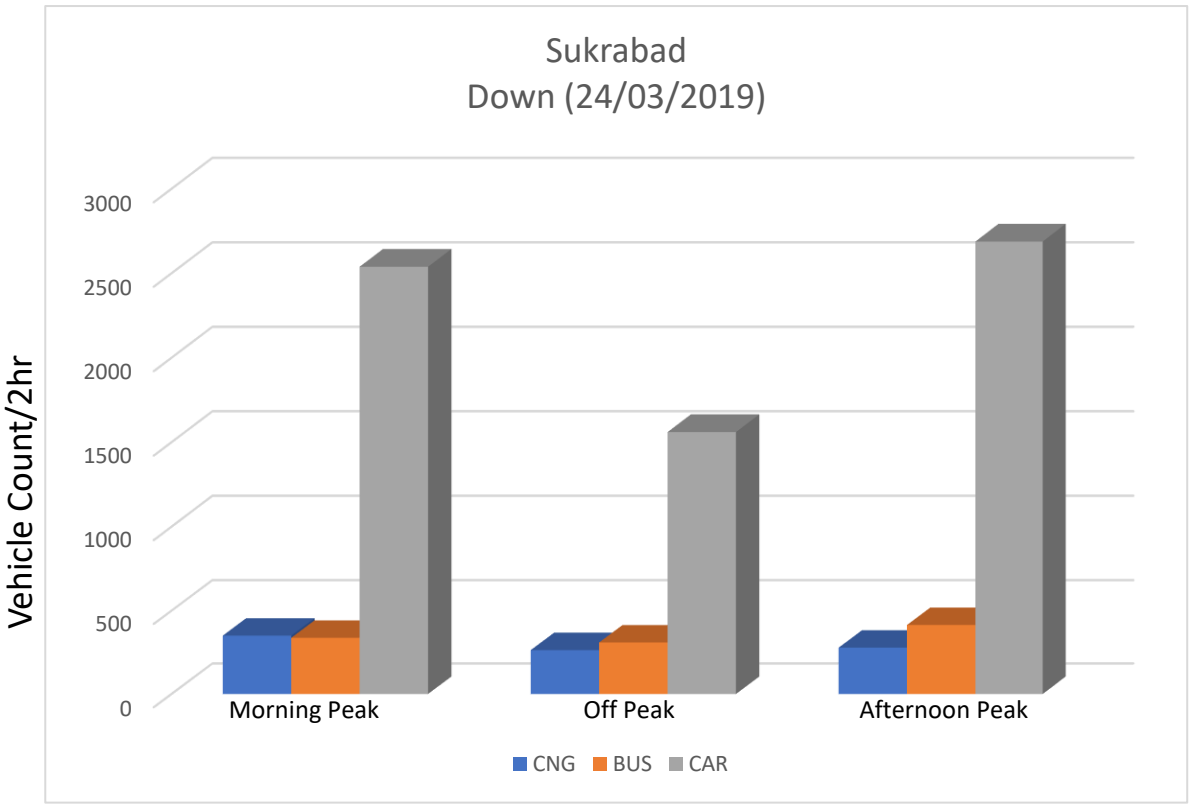

On the 4/9/2019, the number of CNGs is higher than downward at morning peak.




On the 21/3/2019, the number of CNGs and buses are higher than downward at morning peak and the number of CNGs is higher than upward at afternoon peak.

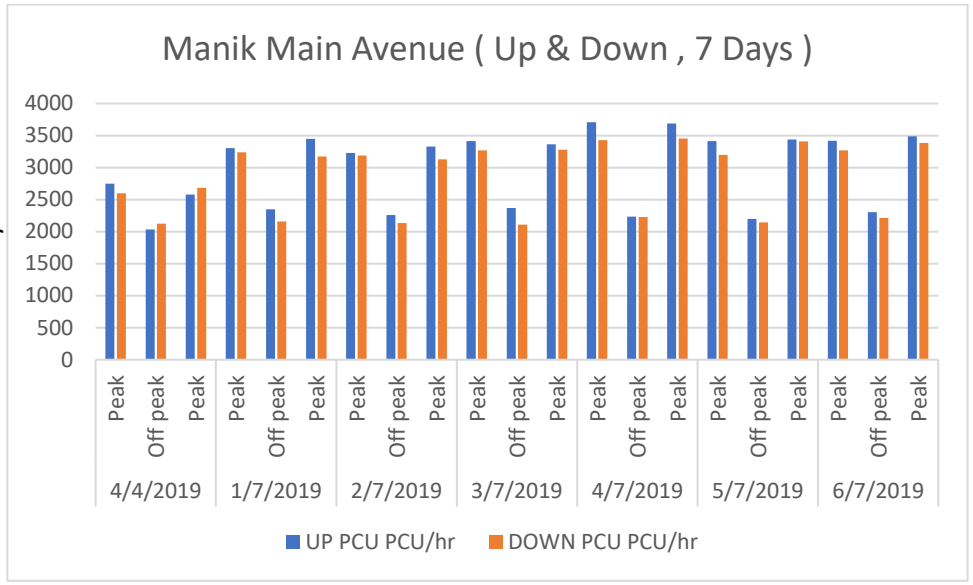


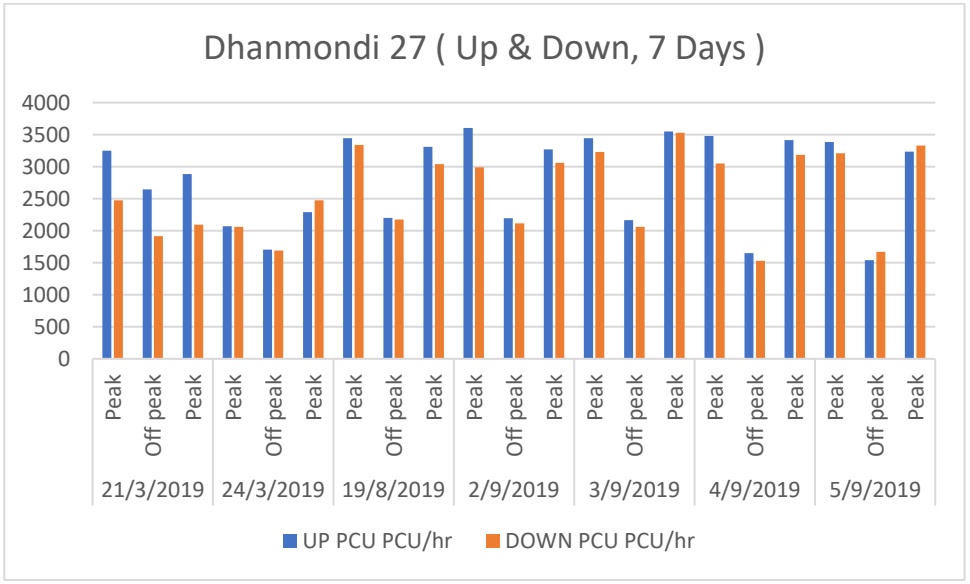



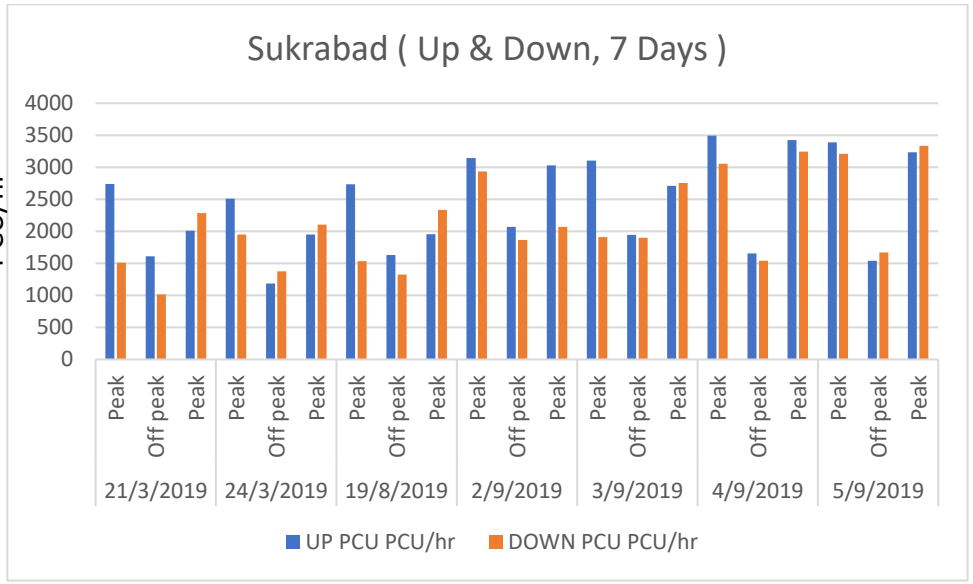

On the 24/3/2019, the number of CNGs and buses are less then upward at morning peak and the number of cars is higher than upward at off peak.

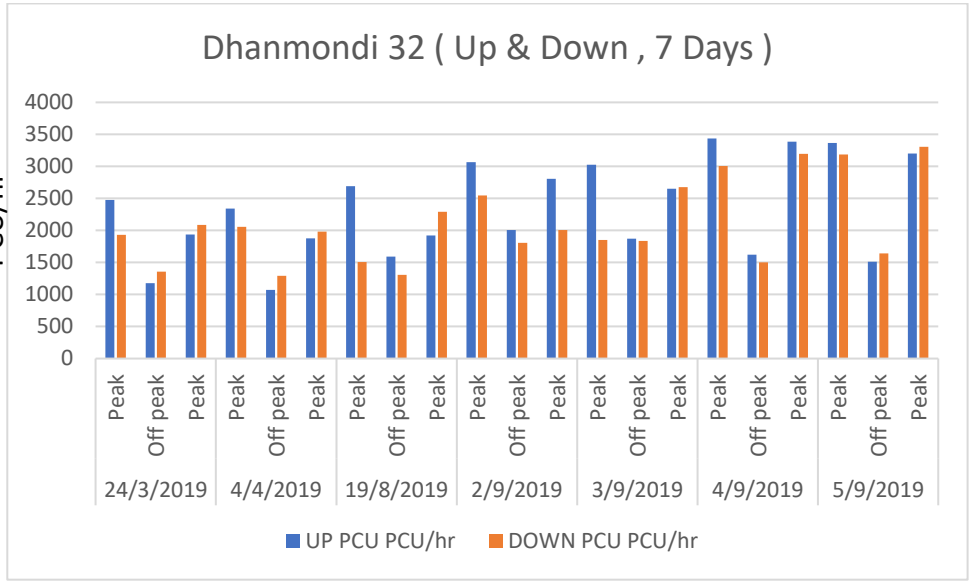
This time from the bar chart we can see that the number of cars in each of the four intersections we have involved is higher than bus and CNG. Although the number of buses and CNG has changed many days, the number of cars has always been high.

Next, we draw bar chart from the PCU data obtained from each intersection.






From the collected traffic volume data, we can see seven days of PCU variation at each intersection through the bar chart plotted from the value of the PCU. We extend the polygon line from Manik Mian Avenue to Asadgate and Dhanmondi 32 to Kalabagan because the cars coming to Manik Mian will come from Asadgate and the cars coming to Dhanmondi 32 will come from Kalabagan. Then we divide the PCU data received at each intersection by 2 because we have 2 lanes on the surveyed road. Then replace the received PCU data over the Intersection link through the **ArcGIS** application. Substitute PCU data into 6 categories and select different colors for each category.


Fig 4.1: PCU wise Color Variations

Then through the time slider we see difference in the intersection link of each day's PCU. Due to the unique color, we can see the difference of PCU data over time on the intersection link.

## 4.2. Result:

After inputting the day wise hourly PCU/Lane data through the ArcGIS application for each intersection link, the time slider shows us different color line above the intersection relative to the PCU/Lane.


Fig 4.2: Hourly PCU/Lane variations from 21/3/2019 to 25/3/2019

From 21/3/2019 to 25/3/2019 based on these five-day PCU data, from the color line we can see that the value of this five-day PCU from Manik Mian to Asadgate was from the range 1001 to 1250. On the other hand, PCU from Dhanmondi 32 to Sukrabad and Sukrabad to Dhanmondi 27 and Dhanmondi 27 to Manik Mian were between 751 to 1000. Simultaneously, the other lane was within PCU 1000 to 1250 from Dhanmondi 27 to Sukrabad and Sukrabad to Kalabagan.


Fig 4.3: Hourly PCU/Lane variations from 16/8/2019 to 20/8/2019

From 16/8/2019 to 20/8/2019 based on these five-day PCU data, from the color line we can see that the value of this five-day PCU from Manik Mian Avenue to Asadgate was from the range 1501 to 1750. On the other hand, from Dhanmondi 32 to Sukrabad and Sukrabad to Dhanmondi 27 and Dhanmondi 27 to Manik Mian Avenue, PCU value was 751 to 1000 and also PCU from Sukrabad to Dhanmondi 32 and Dhanmondi 32 to Kalabagan was within 1001 to 1250. Also, from Dhanmondi 27 to Sukrabad, PCU was from the range 1501 to 1750.


Fig 4.4: Hourly PCU/Lane variations from 30/8/2019 to 3/9/2019

From 30/8/2019 to 3/9/2019 based on these five-day PCU data, from the color line we can see that the value of this five-day PCU from Dhanmondi 32 intersection to Sukrabad and Sukrabad to Dhanmondi 27 and Dhanmondi 27 to Manik Mian was from the range 1501 to 1750 and other hand, Dhanmondi 27 to Sukrabad intersection PCU range was from 1501 to 1750. Also, here we can see that the PCU from Sukrabad to Kalabagan was from the range 701 to 1000.

Then we created a video simulation using ArcGIS aspect of PCU variations over time.

# Chapter-5

# Conclusion

We work with four intersections and presented traffic conditions in the video simulation. It was very difficult to deal with just four intersections data to replicate the real scenario. If there were more intersections working together instead of four intersections, would be a lot of benefit to understanding actual traffic conditions yet time constraints bound us to do so. Moreover, we were not able to collect traffic data at the same time at each intersection during the data collection, resulting in gaps in the simulation. We considered three types of vehicles while collecting traffic volumes. We believe that the representation could have been much better with larger amount of data in terms of duration and variations in the vehicle types. However, this thesis output would provide a good platform to introduce the method of representation.

Based on the results, we found similarities in the traffic congestion situation with the traffic count distributions for different intersections over the period of the study. In Sukrabad to Dhanmondi 27 intersection the similarity was very significant during 16/8/2019 to 20/8/2019 and 30/8/2019 to 3/9/2019. And also, Dhanmondi 27 to Kalabagan intersection the similarity was very significant during 21/3/19 to 25/3/2019. However, Sukrabad to Kalabagan and Manik Mian to Asadgate intersection exhibits quite different representation compared to the obtained traffic count. This might be a result of PCU consideration as well. However, the method that was demonstrated in this thesis could be a decent start of resourceful research projects.

In the future, the study of roadway capacity and saturation flow can be included for better portraying of the congestion situation. The data volume can be increased in terms of number of days and vehicle types for more accurate

representation. Our thesis will help a lot in determining how much PCU each intersection has for automation traffic signaling. This can lead to the application of modern concepts i.e. cooperative greens for consecutive intersections for betterment of the traffic flow. As a result, we can achieve the most efficient method of traffic management for sustainable development of Dhaka city.

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