

# TRAFFIC MANAGEMENT AT RAILWAY CROSSING

Chhimpi Manthan P.<sup>1</sup>, Patel Gaurav S.<sup>1</sup>, Patel Jasmit R.<sup>1</sup>, Mr. Rahul Patel<sup>2</sup>

<sup>1</sup>Laxmi Institute of Technology, Sarigam

<sup>2</sup>Assistant Professor, Dept. of Civil Engineering, Laxmi Institute of Technology, Sarigam, Gujarat

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**Abstract** - Traffic congestion at railway crossing is the biggest problem faced by people now a days where the over bridge is not constructed or difficult to construct. Traffic congestion problem occur due to increase the use of vehicle, increase the vehicular queueing, to longer time railway gates closed and improper queueing of vehicle near the railway crossing. The effect of traffic congestion at railway crossing are increase delay and travel time, Fuel consumption, noise pollution and air Pollution. Traffic congestion can lead to drivers becoming frustrated and engaging in road rage. To overcome the traffic congestion at railway crossing we can separate traffic at railway crossing in two different lane with help of dividers and automatic rising bollards .One lane for one side traffic and second lane for other side traffic so that they crossing the railway gates without any problem faced Using bollard and divider we can overcome traffic congestion at railway crossing where over bridge is not constructed yet and difficult to construct in future because of less space at railway crossing.

**Keywords:** Bollard, traffic management, railway crossing

## 1. INTRODUCTION

Traffic engineering is the engineering which deals with planning and geometric design of roads and highways and with traffic operations thereon, as their use is related to the safe, convenient and economic transportation of goods and person. At railway crossing many time gates are closed for long time there for traffic congestion problem created at railway crossing. At time of gate opening, all vehicles are rushed at the same time to cross the railway track, so to overcome this situation we have chosen this project.

The safety and the smooth flow of traffic is very important. Traffic management doesn't only make people feel safe, but it also provides full safety for them. Traffic management is necessary to have a traffic that will help in managing the flow of traffic on the roads. In order to have an organized and well-working of traffic management.



Fig -1: Railway Crossing

The major task of the traffic management is to process, collect, and forward the necessary information about a certain traffic situation. Furthermore, it more helps in providing guidelines and proper managing the traffic on all roads. As stated earlier, Traffic management is more important for the full safety and security of not only drivers, but also for pedestrians walking on the road.

### 1.1 Dangerous situation at level crossing

- There is low sight distance provided to a signal display.
- Vehicles queue across tracks due to congestion.
- Traffic control is adequate.
- There are lacks of pedestrian facilities.
- Signalling equipment is located too close to the road.
- Pavement is not maintained.

### 1.2 Introduction to Bollard

A bollard is a standalone post, typically steel, short, and sturdy and anchored in a hard surface such as concrete. The low profile, post-shaped deterrent is built with the purpose of blocking vehicle movement from all directions, while allowing for full pedestrian movement. Bollards are designed to withstand high impacts and deflect potential blows away from the object or area they're in place to protect.



Fig -2: Bollards

Types of Bollards: There are several types of bollards which offer a various types of protections.

- Fixed Bollards
- Automatic Bollards
- Decorative Bollards
- Lighted Bollards
- Manual Bollards
- Removable Bollards

Uses of Bollards: Parking lot protection, Drive thru lanes, Factories and warehouses, Traffic manages.

## 2. Research study

Over site selection is based on town where traffic congestion occurs due to railway crossing and other alternatives problems. Due to traffic congestion, people faced many problems like fuel consumption, time consumption, increase is travel time and delay time. Therefore, we have selected that types of site where all types of vehicles like two wheelers, three wheelers, four wheelers, buses, trucks and loaded and unloaded vehicles travel in day and night. In first stage of project we can select three site of project. 1. Bhilad railway crossing. 2. Bilimora railway crossing. 3. Udwada railway crossing. After the preliminary survey is done at respect site we can final the site that is udwada railway crossing. In second stage of project we can do the survey work without barrier/obstruction and taking reading of vehicles. We can also perform survey work with barrier /obstruction and taking reading of vehicles. We can taking reading of all types of vehicles such as 2 wheels, 3 wheels, 4 wheels and other vehicles

### 2.1 Method of volume count

**Mechanical counters:** In this method volume is automatically recorded and can be used. Various method are listed below

- 1) Pneumatic tube
- 2) Electric contacts device
- 3) Co-axial cable

- 4) Photo electric device
- 5) Radar
6. Infrared device
- 6) Magnetic device
- 7) Ultrasonic device

**Manual counts:** In this method the members of field team collect the necessary information on the prescribed records sheet at the selected points of roadways.

Traffic volume count with barriers we have perform manual count method for the traffic volume study. The number vehicles crossing a section of road per unit time at any selected period is called traffic volume.



Fig -3: Survey without barrier



Fig -4: Survey with barrier

### 3. OBSERVATION

Table -3: Survey without barrier from Udwada. Day 2

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:03	09:10	15	04	13	03	35
	09:14	09:21	13	03	04	05	25
	09:25	09:31	13	07	08	04	32
	09:40	09:45	17	03	04	02	26
	09:47	09:59	14	07	04	02	27
10:30 To 11:30	10:30	10:41	09	06	09	05	29
	10:44	10:50	15	05	08	03	31
	10:52	10:57	10	04	07	03	24
	10:59	11:02	17	03	04	02	26
	11:05	11:30	14	07	04	02	27
12:00 To 01:00	11:14	11:19	09	06	09	05	29
	11:24	11:29	18	03	09	06	36
	12:02	12:10	07	04	05	03	19
	12:15	12:19	18	04	09	02	33
	12:23	12:31	12	06	10	00	28
01:30 To 02:30	12:35	12:46	14	03	08	05	30
	12:50	12:59	14	04	12	02	32
	01:30	01:40	18	09	08	01	36
	01:45	01:49	12	06	12	01	31
	01:52	02:00	19	03	08	02	32
03:00 To 04:00	02:03	02:09	20	04	06	03	33
	02:12	02:19	14	03	07	02	26
	02:23	02:29	10	02	09	04	25
	03:00	03:09	14	07	04	02	27
	03:13	03:19	10	01	10	04	25
04:30 To 05:30	03:22	03:30	17	03	04	02	26
	03:36	03:46	13	04	08	02	27
	03:50	03:57	18	03	07	00	28
	04:32	04:39	19	07	06	02	34
	04:41	04:55	20	04	06	03	33
	04:57	04:01	14	03	07	02	26
	05:05	05:07	10	02	09	04	25
	05:10	05:15	16	03	05	02	26
	05:18	05:22	15	05	08	04	32
	05:24	05:28	19	01	06	00	26

Table -1: Survey without barrier from Udwada. Day 1

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:03	09:09	16	05	06	03	30
	09:15	09:23	12	02	08	05	27
	09:28	09:31	13	04	09	04	30
	09:39	09:44	15	03	07	02	27
	09:48	09:56	11	05	05	02	23
10:30 To 11:30	10:31	10:38	10	03	10	05	28
	10:44	10:49	12	06	04	04	26
	10:51	10:56	09	05	09	03	31
	10:58	11:01	10	07	05	02	24
	11:05	11:08	13	04	08	02	27
12:00 To 01:00	11:10	11:19	18	03	07	00	28
	11:23	11:28	19	07	06	02	34
	12:04	12:12	20	06	03	01	30
	12:15	12:19	15	04	13	03	35
	12:23	12:32	13	03	04	05	25
01:30 To 02:30	12:35	12:45	13	07	08	04	32
	12:50	12:58	18	03	06	06	33
	01:35	01:42	19	06	09	02	36
	01:46	01:47	20	05	11	05	39
	01:52	01:59	18	04	10	05	37
03:00 To 04:00	02:03	02:10	21	04	05	00	30
	02:12	02:17	14	05	12	05	36
	02:21	02:27	16	04	15	06	41
	03:06	03:10	19	03	08	02	32
	03:13	03:18	17	03	09	05	34
04:30 To 05:30	03:21	03:30	18	09	08	01	36
	03:32	03:45	12	06	12	01	31
	03:49	03:58	10	05	12	05	32
	04:32	04:39	09	06	09	05	29
	04:41	04:55	18	03	09	06	36
	04:56	04:01	07	04	05	03	19
	05:05	05:07	18	04	09	02	33
	05:11	05:15	12	06	10	00	28
	05:19	05:22	14	03	08	05	30
	05:26	05:29	14	04	12	02	32

Table -2: Survey without barrier to Udwada. Day 1

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:03	09:09	10	04	08	02	24
	09:15	09:23	14	05	06	04	29
	09:28	09:31	19	03	08	02	32
	09:39	09:44	20	04	06	03	33
	09:48	09:56	14	03	07	02	26
10:30 To 11:30	10:31	10:38	10	02	09	04	25
	10:44	10:49	14	07	04	02	27
	10:51	10:56	10	01	10	04	25
	10:58	11:05	17	03	04	02	26
	11:05	11:08	13	04	08	02	27
12:00 To 01:00	11:10	11:19	18	03	07	00	28
	11:23	11:28	19	07	06	02	34
	12:04	12:12	20	06	03	01	30
	12:15	12:19	15	04	13	03	35
	12:23	12:32	13	03	04	05	25
01:30 To 02:30	12:35	12:45	13	07	08	04	32
	12:50	12:58	17	03	04	02	26
	01:35	01:42	14	07	04	02	27
	01:46	01:47	09	06	09	05	29
	01:52	01:59	18	03	09	06	36
03:00 To 04:00	02:03	02:10	07	04	05	03	19
	02:12	02:17	18	04	09	02	33
	02:21	02:27	12	06	10	00	28
	03:06	03:10	14	03	08	05	30
	03:13	03:18	14	04	12	02	32
04:30 To 05:30	03:21	03:30	18	09	08	01	36
	03:32	03:45	12	06	12	01	31
	03:49	03:58	15	04	13	03	35
	04:32	04:39	13	03	04	05	25
	04:41	04:55	13	07	08	04	32
	04:56	04:01	17	03	04	02	26
	05:05	05:07	14	07	04	02	27
	05:11	05:15	09	06	09	05	29
	05:19	05:22	15	05	08	03	31
	05:26	05:29	10	04	07	03	24

Table -4: Survey without barrier to Udwada. Day 2

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:03	09:10	13	06	08	02	29
	09:14	09:21	19	03	08	02	32
	09:25	09:31	20	04	05	02	31
	09:40	09:45	14	03	07	00	24
	09:47	09:59	10	02	09	04	25
10:30 To 11:30	10:30	10:41	16	04	03	01	24
	10:44	10:50	12	02	12	01	27
	10:52	10:57	19	03	08	02	32
	10:59	11:02	20	04	06	03	33
	11:05	11:10	14	03	07	02	26
12:00 To 01:00	11:14	11:19	10	02	09	04	25
	11:24	11:29	14	07	04	02	27
	12:02	12:10	10	04	07	03	24
	12:15	12:19	17	03	04	02	26
	12:23	12:31	14	07	04	02	27
01:30 To 02:30	12:35	12:46	09	06	09	05	29
	12:50	12:59	18	03	09	06	36
	01:30	01:40	07	04	05	03	19
	01:45	01:49	18	04	09	02	33
	01:52	02:00	12	06	10	00	28
03:00 To 04:00	02:03	02:09	14	03	08	05	30
	02:12	02:19	12	02	05	01	20
	02:23	02:29	18	00	12	02	22
	03:00	03:09	16	05	06	03	30
	03:13	03:19	18	02	05	03	28
04:30 To 05:30	03:22	03:30	11	03	05	02	21
	03:36	03:46	21	04	02	03	29
	03:50	03:57	19	02	06	03	30
	04:32	04:39	15	03	04	03	25
	04:41	04:55	11	02	05	00	18
	04:57	04:01	15	01	04	02	22
	05:05	05:07	13	00	08	01	22
	05:10	05:15	14	05	03	00	22
	05:18	05:22	19	04	04	03	30
	05:24	05:28	12	03	06	02	23

Table -5: Survey with barrier from Udwada. Day 3

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:02	09:12	19	07	10	05	41
	09:15	09:23	22	08	08	04	42
	09:26	09:35	25	05	09	05	44
	09:37	09:42	21	04	08	03	36
	09:45	09:57	28	06	06	01	41
10:30 To 11:30	10:32	10:40	21	09	07	02	39
	10:46	10:50	29	04	09	05	47
	10:54	10:58	23	08	12	04	47
	11:00	11:03	25	07	08	06	46
	11:06	11:09	23	07	08	00	38
12:00 To 01:00	12:01	12:13	25	04	05	02	36
	12:15	12:20	28	00	08	03	39
	12:24	12:33	24	03	07	01	35
	12:35	12:41	15	07	05	01	28
	12:48	12:57	21	04	04	03	32
01:30 To 02:30	01:32	01:40	19	05	09	02	35
	01:44	01:47	18	08	08	06	40
	01:54	01:58	16	06	10	05	37
	02:03	02:08	21	07	08	04	40
	02:11	02:18	24	08	07	00	39
03:00 To 04:00	02:21	02:27	20	09	10	02	41
	03:01	03:08	19	04	04	03	30
	03:12	03:18	15	07	12	01	35
	03:21	03:28	14	07	07	03	31
	03:32	03:44	18	07	07	00	32
04:30 To 05:30	03:51	03:59	17	06	08	02	33
	04:32	04:37	19	08	07	01	37
	04:41	04:56	26	00	12	04	42
	04:59	04:02	24	03	06	02	35
	05:05	05:08	23	05	08	02	38
05:30 To 06:30	05:12	05:14	29	06	08	03	46
	05:17	05:21	20	00	09	02	31
	05:25	05:30	27	02	06	01	36

Table -7: Survey with barrier from Udwada. Day 4

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:00	09:09	18	04	07	05	34
	09:14	09:23	26	00	09	02	37
	09:27	09:35	22	07	06	03	38
	09:38	09:43	21	05	08	02	36
	09:47	09:55	25	06	07	03	41
10:30 To 11:30	10:30	10:39	24	07	04	02	37
	10:44	10:48	19	06	07	03	35
	10:50	10:54	17	06	12	02	37
	10:57	11:02	24	07	04	02	37
	11:04	11:08	19	06	09	05	39
12:00 To 01:00	11:10	11:19	18	07	12	02	37
	11:22	11:28	25	07	10	02	44
	12:03	12:11	23	05	09	01	38
	12:14	12:18	24	04	07	01	36
	12:21	12:30	29	04	04	03	40
01:30 To 02:30	12:33	12:45	20	07	08	02	37
	12:51	12:58	25	05	07	02	39
	01:34	01:42	23	07	08	00	38
	01:45	01:47	26	01	06	01	34
	01:51	01:59	21	04	09	04	38
03:00 To 04:00	02:03	02:10	25	04	05	02	36
	02:12	02:17	28	00	08	03	39
	02:20	02:27	24	03	07	01	35
	03:06	03:10	15	07	05	01	28
	03:13	03:18	21	04	04	03	32
04:30 To 05:30	03:22	03:30	24	03	08	02	37
	03:33	03:45	19	07	07	00	33
	03:47	03:58	17	06	04	03	30
	04:31	04:37	26	09	05	01	41
	04:40	04:52	24	06	07	03	40
05:30 To 06:30	04:55	05:01	23	07	12	03	45
	05:07	05:12	25	05	06	01	36
	05:15	05:19	30	04	09	03	46
	05:21	05:23	18	07	09	02	36
05:27	05:30	26	05	09	02	42	

Table -6: Survey with barrier to Udwada. Day 3

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:02	09:12	19	08	07	03	37
	09:15	09:23	26	00	12	04	42
	09:26	09:35	24	03	06	02	35
	09:37	09:42	23	05	08	02	38
	09:45	09:57	29	06	08	03	46
10:30 To 11:30	10:32	10:40	17	06	08	04	35
	10:46	10:50	28	05	07	02	42
	10:54	10:58	25	04	08	03	40
	11:00	11:03	23	05	09	02	39
	11:06	11:09	24	06	13	02	45
12:00 To 01:00	11:13	11:19	19	04	04	01	30
	11:24	11:30	15	07	12	01	35
	12:01	12:13	14	07	07	03	31
	12:15	12:20	18	07	07	00	32
	12:24	12:33	17	06	08	02	33
01:30 To 02:30	12:35	12:41	24	04	06	01	35
	12:48	12:57	19	06	09	05	39
	01:32	01:40	18	05	05	03	31
	01:44	01:47	15	03	08	06	32
	01:54	01:58	13	05	10	04	32
03:00 To 04:00	02:03	02:08	14	04	08	05	31
	02:11	02:18	20	00	09	02	31
	02:21	02:27	27	02	06	01	36
	03:01	03:08	22	05	08	02	37
	03:12	03:18	25	06	07	03	41
04:30 To 05:30	03:21	03:28	19	08	11	02	40
	03:32	03:44	22	05	07	03	37
	03:51	03:59	27	03	12	02	44
	04:32	04:37	24	06	14	02	46
	04:41	04:56	29	06	05	01	41
05:30 To 06:30	04:59	04:02	18	03	09	06	36
	05:05	05:08	17	05	09	05	36
	05:12	05:14	18	04	09	02	33
	05:17	05:21	22	06	10	00	38
05:25	05:30	25	04	07	03	39	

Table -8: Survey with barrier to Udwada. Day 4

Survey Time	Gate Opening Time	Gate Closing Time	Types of Vehicles				Total Vehicles
			2 Wheels	3 Wheels	4 Wheels	Others	
09:00 To 10:00	09:00	09:09	14	04	10	05	33
	09:14	09:23	19	03	08	06	36
	09:27	09:35	20	00	06	04	30
	09:38	09:43	15	03	07	02	27
	09:47	09:55	18	07	08	03	36
10:30 To 11:30	10:30	10:39	16	04	09	01	30
	10:44	10:48	11	06	12	03	32
	10:50	10:54	15	07	09	03	34
	10:57	11:02	18	06	09	02	35
	11:04	11:08	24	02	11	00	37
12:00 To 01:00	11:10	11:19	18	04	15	03	40
	11:22	11:28	20	07	04	01	32
	12:03	12:11	17	04	08	04	33
	12:14	12:18	12	04	07	02	25
	12:21	12:30	15	07	12	01	35
01:30 To 02:30	12:33	12:45	14	07	07	03	31
	12:51	12:58	18	07	07	00	32
	01:34	01:42	17	06	08	02	33
	01:45	01:47	24	04	06	01	35
	01:51	01:59	19	06	09	05	39
03:00 To 04:00	02:03	02:10	18	05	05	03	31
	02:12	02:17	15	03	08	06	32
	02:20	02:27	13	05	10	04	32
	03:06	03:10	14	04	08	05	31
	03:13	03:18	19	01	09	01	30
04:30 To 05:30	03:22	03:30	20	06	06	02	34
	03:33	03:45	15	08	04	06	33
	03:47	03:58	18	02	08	03	31
	04:31	04:37	16	03	06	05	30
	04:40	04:52	21	01	08	06	36
05:30 To 06:30	04:55	05:01	19	05	09	04	37
	05:07	05:12	25	06	07	05	43
	05:15	05:19	24	04	08	08	44
	05:21	05:23	22	05	06	04	37
05:27	05:30	21	06	09	06	42	

#### 4. RESULT AND CONCLUSION

Based on 4 day observation at railway crossing with and without barrier result is analysed. Traffic count is correlated with each other by simple addition of vehicles to get rough idea about the quantity of vehicle that can pass with and without bollard. And total summation of morning and evening peak hour traffic count of 2 days are shown below to analysed result which is concluded.

**Table -9: Reading Comparison**

Day	Survey time	Trial	Data from Udwada		Data towards Udwada	
			without Barrier	with Barrier	without Barrier	with barrier
Day-1	9.00 to 10:00	1	30	41	24	37
		2	27	42	29	42
		3	30	44	32	32
		4	27	36	33	38
	4:30 to 5:30	1	29	42	25	46
		2	36	35	32	36
		3	33	38	26	36
		4	30	46	27	38
Day-2	9.00 to 10:00	1	35	38	29	33
		2	25	41	32	36
		3	32	36	31	30
		4	26	37	24	27
	4:30 to 5:30	1	34	41	25	36
		2	33	40	18	37
		3	26	45	22	43
		4	25	46	22	44

By performing survey work without barrier and survey work with barrier and compare both the readings of vehicle with barrier and without barrier we can say that the reading of vehicle with barrier is more than reading of vehicle without barrier. In other words we can say that after the railway crossing is open more no. of vehicles is passing when the barrier is putting between railway crossings. we can say that vehicles is easily cross the railway crossing without any types of problems, such as traffic congestion at railway crossing, vehicles accident. Putting the barrier at railway crossing gives advantage such as smooth traffic flow of vehicles, reducing the minor accident; reduce traffic congestion at railway crossing etc.

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#### BIOGRAPHIES



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