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TRUCK OVERLOADING STUDY AND STRATERGY TO MINIMIZE ITS IMPACT: CASE STUDY ON AHMEDABAD RING ROAD

Hardik jayswal[1], Srinath Karli[2], Vrundani vaidhya[3]

[1]M.E.Transportation Semester-4th student, Hasmukh Goswami College of Engineering, GTU
[2]Srinath Karli, Asst. Professor, Department of Transportation Engineering, Hasmukh Goswami College of Engineering
[3]vrundani vaidya, Head of the Department, Department of Civil Engineering, Hasmukh Goswami College of Engineering

Abstract- **Most of the modern truck engines is capable of hauling much heavier loads than the legal upper limit. Therefore the truck owners and operators have a tendency to overload these trucks enabling them to get more returns for the same investment and manpower. Use axle weight pad for axle load survey. It is observed from the study, that the percentage of overloading of commercial vehicles is very high, which result in greater extent of damage to the pavement, thus reducing the serviceable life of pavement.**

Keywords- *Axle load, Truck Overloading*

I. INTRODUCTION

Trucks are the major consumers of the Road network, applying the heaviest loads to the road network. In order to maintain the heavy gross vehicle weight and still stay within the legal axle load limits, the trucking industry has devised the multiple axle configurations, which include rear tandem axle trucks. We realize that overloading causes the damage of road pavement at exponential rate of average power fourth. 10% overloaded truck can damage road pavement greater than 40% comparing to the same load limited truck. 21 tons legal loaded truck is overloaded to 30 tons loaded truck; it reduced life span of road from 15 years to only 3.16 years.

Objectives of this research

(i) To observe the surface condition due to traffic overloading.
(ii) To find the truck overloading by axle load survey.
(iii)To minimize the impact of truck overloading by different method.

Aim: to find truck overloading by axle load survey and minimize its impact

II. LITERATURE REVIEW

Chhoeuy Roeu and Mony researches, studies and other references for problems related to deterioration of road pavement due to overloading and its trend in the future. The Ministry of Public Works and Transport that is an solely arm of the Royal Government of Cambodia to start regulating and enforcing the limit of loads transported by vehicles such as a national seminar on "maximal load limit of the road transport vehicles trafficking on national roads in the Kingdom of Cambodia" was held on February 1, 2000.

Aman Kishore and Rod Klashinsky works on Asian and other countries in transition have encouraged dramatic road infrastructure development in order to promote and sustain continued economic growth. Increase Safety: The efficient movement of goods via commercial vehicles must be balanced with concerns for safety of the motoring public. Prevent Overloading: It is well known amongst enforcement officials that visibility of enforcement programs cuts down on the frequency of overweight trucks. Numerous stations with WIM technology in North America have witnessed the number of overweight trucks increase by as much as 50% when the stations are closed.

K.K.Pujara studies in Overloading highway and related issues .in this studies we have an extensive network of roads of different categories including expressways, highways and other roads. There has been phenomenal increase in volume of goods to be shipped across the places.

Worsak research on Overloading issue in Thailand, in this research Worsak studies According to the statistics in 1996, overloading usually occurs on ten wheel truck and it is occupies around 25% of all truck combined, with carry 78% of the shipment by weight. Based on the statics collected by weight in motion (WIM), they found that 33% of ten wheel trucks are overloaded. 94% of these weight for a ten wheel truck (axle weight is 8.2 tones). Worsak indicated that 81% of total damage to the highway is caused by 33% of overloaded truck.

III. STUDY AREA

The study was carried out on Ahmedabad Ring road, Gujarat. The proposed widening from intermediate 2 lane ring road section 76.30 km long will provide the safe movement of heavy iron bearing traffic moving from mines situated. At present, the truck movement was using narrow road section of 6 m wide, with frequent traffic blockade due to bad condition and accident-prone locations. 76 km ring road 46 town planning are connected in this stretch. In the overloading traffic survey road corridor selected to the investigation. The road selection is based on the location of commercial and industrial cities. Ahmadabad ring road tall booth located at Asalai circle to Dastan farm 19.3 km. Developments of road network and economy has an inter-relationship. This research is a study of the overloading problem of Ahmadabad ring road. Ahmadabad ring road directly connected to the Ahmadabad Vadodara express highway.

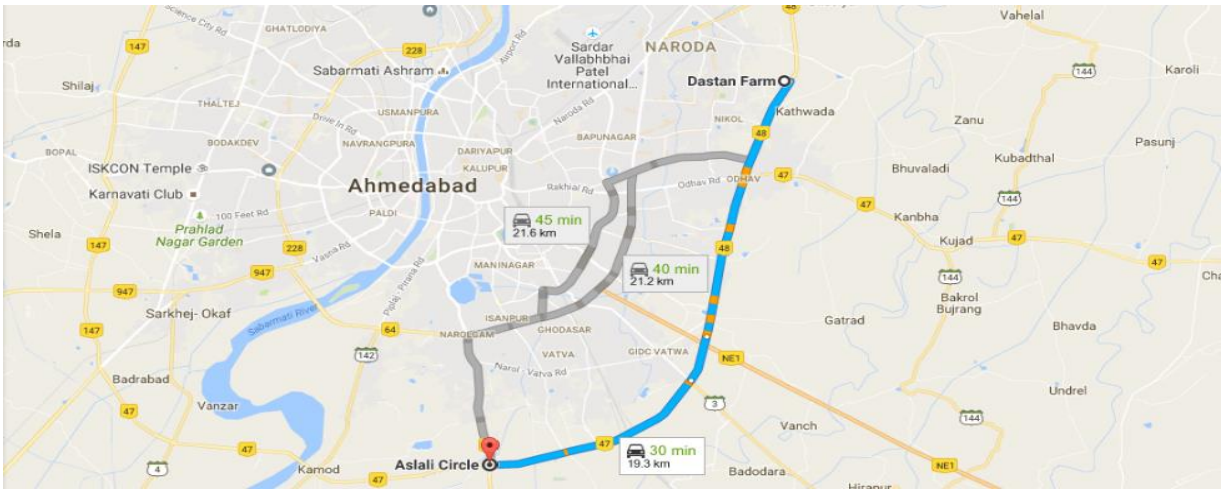

Fig: Study Area Details Ahmedabad ring road

IV. DATA COLLECTION AND ANALYSIS

Data collection in Ahmedabad ring road i.e. Traffic volume survey, Surface condition survey, Axle load survey are carried out in this research paper.

1 Traffic volume survey: Traffic volume is defined as the no. of vehicles crossing particular cross section per unit time. It is measured in vehicle per minute, vehicle per hour and vehicle per day. In order to express the traffic flow on a road per unit time, it is necessary to convert the flow of the different vehicle classes into a standard vehicle class known as passenger car unit. The traffic volume is dynamic and varies during 24 hours of the day. Daily traffic volume varies on different days of a week and different months and seasons of the years.

Table 4.9 Traffic count survey at Ramol tall plaza

Number	Date	LCV (Double Axle)	TRUCK (Three Axle)	MAV (Four, Five, Six Axle)	TOTAL TRUCK
1	19-12-2016	958	619	2321	3898
2	20-12-2016	1052	785	2332	4169
3	21-12-2016	1002	746	2215	3963
4	22-12-2016	984	624	2209	3961
5	23-12-2016	856	754	2352	3962
6	24-12-2016	1026	802	2402	4230
7	25-12-2016	976	807	2396	4179

2 Axel load survey: The axle load of a wheeled vehicle is the total weight felt by the roadway for all wheels connected to a given axle. Viewed another way, it is the fraction of total vehicle weight resting on a given axle. Axle Load survey was carried out at the selected location wherein larger sample size of the trucks have been weighed. At this selected survey location, arrangements were made for the installation of the weighing pads. The top surface of the weighing axle pad was kept in level with the road surface. The survey was conducted for both up and down directions.

The portable wheel weight measuring equipment was used for the measurement of wheel loads. The size of the weighing unit permitted only one single or twin tyre assembly to be weighed at a time. Each vehicle to be weighed was aligned on to the unit and stopped with the wheel being weighed at the centre of the top plate. The vehicle was

stopped just long enough for the reading on the display unit to get stabilized. The same procedure was repeated with the next level.

2.1 Axle weighting pad: In my study area there are used axle weight pad for axle load survey. In this survey data collect when the truck axle are moving on axle weight pad. When the tyres are passing on axle pad weight is noted. Capacity of this axle weight pad 30 ton per set of two wheel pads or 15 ton per wheel pad.

Fig axle weight pad

Axle load survey analysis: In this study there are 629 vehicles (truck) to be survey for axle load. In my study are there are 451 three axle, 266 four axle, 88 five axle and 37 six axle trucks.

AXLE LOAD	AXLE DISTRIBUTIOIN OF VEHECLIES								TOTAL AXLE WEIGHT: NO OF VEHICLES			
									FRONT		REAR	
IN Ton	F1	R1	R2	R3	R4	R5	R6	R7	LEGAL	ILLEGAL	LEGAL	ILLEGAL
1.0-2	23	66	20	7	3	2	0		23		98	
2.1-3	224	92	28	10	2	0	0		224		132	
3.1-4	340	121	59	26	11	2	0		340		219	
4.1-5	32	151	158	77	24	7	0		32		420	
5.1-6	3	150	133	91	24	4	0		3		402	
6.1-7	3	30	44	49	21	2	0			3	146	
7.1-8	3	12	3	5	1	1	0			3	22	
8.1-9	2	2	5	1	1	1	0			2	10	
9.1-10	0	1	0	0	1	0	0					1
10.1-11	0	0	0	0	0	0	0					0
11.1-12	0	0	0	0	0	0	0					0
12.1-13	0	0	0	0	0	0	0					0
13.1-14	0	0	0	0	0	0	0					1
14.1-15	0	1	1	0	0	0	0					2
15.1-16	0	0	0	0	0	0	0					0
16.1-17	0	0	0	0	0	0	0					0
17.1-18	0	0	0	0	0	0	0					0
18.1-19	0	1	0	0	0	0	0					1
19.1-20	0	0	0	0	0	0	0					0
20.1-21	0	0	0	0	0	0	0					0
21.1-22	0	0	0									0
TOTAL	629	629	451	266	88	37	0	0	621	8	1451	4

Table axle load analysis ahmedabad ring road

Surface condition: surveySurface condition survey shall precede the actual deflection measurement and consists primarily of visual observations supplemented by measurements for estimation of cracking, rutting and other distresses in the pavement. It may be prudent to identify possible causes of distress using visual observation of surface of the road.

Fig rutting at Ahmedabad ring road

In this visual observation we find the rutting on the surface due to overloading of truck in my study area location. This survey is carried out by measurements of the rutting by wooden stick transversely place on the rutting section and measure depth of the rutting and this rutting is compare with the IRC:81-1997.

V. RECOMMANDATION AND CONCLUSION

Strategy to minimize truck overloading: In Ahmadabad case study demonstrates a comprehensive strategy for overload control based on the trend-setting guidance provided. The only key element of the strategy not yet in place is the decriminalization of overloading offences. . However, this issue is the subject of an on-going study recommending an infringement system in place of the more traditional prosecution system with has limited effectiveness. A strategy on Overload control was thus developed recommending the following measures:

- Developing weighbridge facilities at strategic locations on the network;
- Establishing a cadre of personnel dedicated to overload control and other road safety enforcement;
- Maintaining the efficiency and effectiveness of overload control through private sector participation in the management of overload control operations;
- Developing a networking system of all the weighbridge facilities for monitoring the operations and minimizing human interventions and therefore malpractices;
- Consulting stakeholders at all stages and, in particular, interacting with personnel involved in the judicial system regarding the implications of overloading;
- Encouraging joint overload control operations across borders and sharing of information;
- Introducing overload fees that fully recover the cost of damage of the road pavement.

Conclusion: From this study it can be observe that truck overloading in Ahmadabad ring road. In this study used axle weight pad for axle load survey. After this analysis in this research 12 trucks are overloaded out of 629 trucks.
Overloading of heavy goods road vehicle is a critical problem in developing country. It has an immediate impact in terms of increase road damage, which causes a dramatic increase in road damage, which causes a dramatic increase in road maintenance cost.

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