



Routing of Solid Waste Transport in Ahmedabad City

Vrundani Vaidya

Head of department in Civil Engineering Department, Hasmukh Goswami College of Engineering, Ahmedabad

DARJI BHAVESH M

2year Resident, Department of Civil Engineering, Hasmukh Goswami College of Engineering, Ahmedabad

KEYWORDS

INTRODUCTION

General

Ahmedabad generates almost 4000 Metric Tons of solid waste on a daily basis including 300 MT of construction and demolition debris. This waste is collected, transported, treated and disposed according to the Rules. Deploys more than 12,500 employees. The Vehicle Routing and Scheduling Problem (VRSP) concerns the determination of routes and schedules for a fleet of vehicles to satisfy the demands of a set of customers. The basic Capacitated Vehicle Routing Problem (CVRP) can be described in the following way. We are given a set of homogeneous vehicles each of capacity Q , located at a central depot and a set of customers with known locations and demands to be satisfied by deliveries from the central depot. Each vehicle route must start and end at the central depot and the total customer demand satisfied by deliveries on each route must not exceed the vehicle capacity Q . The objective is to determine a set of routes for the vehicles that will minimize the total cost.

Table - 1.1 Details of collection solid waste collection system

Name of Zone	No. of Wards	Types of Vehicles			Present no. of Working Route
		Tata ACE	Refuse Compactor / Hywa Vehicle	Pedal Rickshaw	
Central	6	85	7	43	90
East	8	88	6	98	88
West	9	100	8	19	88
North	8	101	11	11	104
South	8	85	4	15	88
New West	9	107	11	10	109
Total	48	566	48	196	567

Need of Study

This study needs to assess to improve the existing solid waste transportation system and enhance performance monitoring of the area covering Ahmedabad City. The problem is even more acute in economically developing countries, where financial, human, and other critical resources generally are scarce. Due to the implementation of modern routes, both the public health and the quality of the environment are benefited directly and substantially.

Existing waste collection and transport systems often cannot handle the amount of waste generated by large cities like Ahmedabad with growing populations. When this occurs, waste is disposed of in uncontrolled dumps or openly burned. This

type of unmonitored and uncontrolled waste disposal has negative consequences on human health and the environment. Improvements to waste collection and transport can create jobs, decrease open dumping and burning, increase appeal for tourism, and significantly improve public health.

Problem Definition

Growing urbanization, increasing urban population Solid waste collection is one of the most difficult operational problems faced in Ahmedabad. In most of the zones, solid waste collections are done in an extempore manner, which contributes to high solid waste collection cost. Solid waste collection vehicles are assigned to zones without any serious demand analysis, route construction being left to the drivers. Every time the vehicle is filled up, it heads to the disposal site to unload and then returns to the zones. This method contributes to high solid waste collection cost.

Objectives of Study

Following are the objectives of the present study: -

1. To study the various parameters like cost, traffic, and efficiency for the existing route of new west zone to SWM dump site.
2. To propose new alternative route for improving the service of solid waste transportation.
3. To compare existing routes and propose alternative route with respect to cost, time and efficiency.

Scope of Work

1. To evaluate total collection of solid waste in Ahmedabad city.
2. To evaluate the distribution network of new waste zone, Gota.
3. Data collection: - Normal public opinion
Driver opinion survey
4. To compare existing route with new alternative route by time, cost and efficiency.
5. To compare scheduling of existing route and propose new alternative route.

Organization of Thesis

The report is organized to develop routing and scheduling of solid waste transportation system.

Chapter 1 introduces the concept of evaluation, its history and basic idea, need, scope and objectives of the study.

Chapter 2 introduces the literature reviews related to the study various economic evaluation and basic terminology.

Chapter 3 in this chapter information of study area and methodology has been described according to which the whole work is going to conduct.

STUDY AREA AND METHODOLOGY

Study Area

Ahmedabad is the fifth largest city and seventh largest metropolitan area in India.



Figure: - 3.1 Google image of study area

According to the 2011 census the population of Ahmedabad metropolitan was 6,352,254. The city of Ahmedabad was founded in 1411 AD as a walled city on the eastern bank of the river Sabarmati, now the seventh largest metropolis in India and the largest in the State. The urban agglomeration (UA) population has increased from 3.31 Million in 1991 to 4.5 million in 2001.

Population Forecast

Incorporating AUDA proposals, the GIDB study (2000) carried out by LB estimated the population of the entire study region (AUDA and surrounding area) as below.

Table: - 3.1 Population Forecast

Sr. No.	Year	Population (Million)	Approx. Area (Ha)
1	1981	2.5	19000
2	1991	3.4	23000
3	2001	4.6	30000
4	2011	6.0	40000
5	2021	10.9	50000

Proposed Methodology:

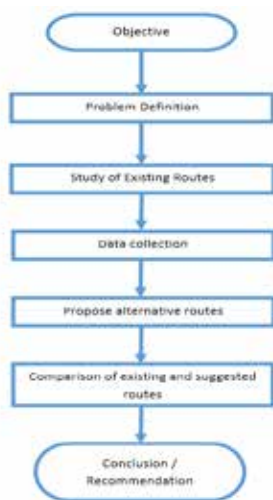


Figure: - 3.2 Flow chart showing methodology

Study of existing routes

As per the need for routing and scheduling transportation for solid waste in Ahmedabad, study of existing route which is

from New west zone to SWG pirana dump site will be carried out with respect to the time, cost, number of vehicles passing daily existing route and various environmental problem due to dumping of solid waste.

Data collection

In this phase various data related to existing route condition for dumping solid waste will be carried out i.e., time consumption by vehicle, cost, rental cost for dumping vehicles. Data related environmental issues are also carried.

Propose alternative Routes

Based upon the data collection and throughout analysis of existing route using for dumping the solid waste, an alternate route will be proposed so that it will be able reduce the problem on existing route.

Comparison of existing and suggested routes

After the proposal of an alternative route comparison has been carried out between the existing route and proposed route with respect to cost, time rental vehicle cost an on environmental issues.

Conclusion / Recommendation

Proposed route which will be selected is eco-friendly, economical and also reduces the travel time hence cost.

Outline

This chapter gives the detail information about study area. Also the flow chart of methodology gives the detail about the study work carried out.

Collection from the wards at New west zone

From the 9 wards of new west zone, collection is done which are shown below:



Figure: - 4.9 Solid waste collection from 9 wards Existing Route

As shown below existing route which is from new west zone to SWM dump site via 132 ft. ring road.



Figure: - 4.11 Google image of an Existing route

- On this route 25 to 30 trips daily trips made by hook loader from New west zone to SWM pirana dump site.
- Daily around 400MT. solid waste collection is done at the new west zone site.
- At this zone 9 wards collection is done which are: Chandlodia, Bodakdev, Gota, Maktampura, Thaltej, Ghatlodia, Jodhpur, Vejalpur, Sarkhej.
- There are 15 hook loader vehicle available for this particular site.
- Load carrying capacity of each hook loader vehicle 15 Tonne.

SUMMARY

In this research routing and scheduling transportation for solid waste in Ahmedabad, study of existing route which is from New west zone to SWG pirana dump site will be carried out with respect to the time, cost, number of vehicles passing daily existing route and various environmental problem due to dumping of solid waste. For this purpose, various data related to existing route condition for dumping solid waste will be carried out i.e., time consumption by vehicle, cost, rental cost for dumping vehicles. Data related environmental issues are also carried.

After the proposal of an alternative route comparison will be carried out between the existing route and proposed route with respect to cost, time rental vehicle cost and on environmental issues in future work. Route which will be selected is eco-friendly, economical and also reduces the travel time hence cost.

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