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Upgradation of urban facilities in rural area. A case study on ropa village

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Abstract-*As per census 2011, rural areas account for 69 percent of India's total population. Development of rural area is essential. Looking at the present scenario the migration of people from rural area to urban area is increasing day by day. Rural development provides an alternative source of livelihood which will have impact of reducing migration. This project focuses on rurbanisation which include redesigning, reimagining, repair, maintenance and sustainable planning for basic needs of rural area.Ropa village is located in Vaghodia Tehsil of Vadodara district in Gujarat, India. Ropa has a total population of 633 peoples. There are about 127 houses in Ropa village. Vadodara is nearest town to Ropa which is approximately 13km away.*

Keywords- *Rural, Urban, Development, Sustainable planning, Road, Construction*.

I. INTRODUCTION

As per census 2011, rural areas account for 69 percent of India's total population. India is a vast and second most populous country of the world.The need of the study is to provide the basic requirements of people in the village.For this purpose the information of the village is collected based on different categories such as Education, Water Facilities, Drainage Facilities, Transportation Facilities, Primary Health Care, Bank Facilities, Public Toilets, Community hall and other amenities. It is very important to develop village area compare to city.The connecting road from highway to village is in poor condition so proper repairing and maintenance is required.

II. STUDY AREA

Locality Name	*Ropa*
Taluka Name	***Vaghodia***
District	***Vadodara***
State	***Gujarat***
Language	***Gujarati, hindi***
Current Time	***2:00 pm***
Date: (IST)	***Tuesday, 09 January 2018***
Time Zone	***IST (UTC+5:30)***
Elevation/Altitude	***33m above sea level***
STD Code	***02668***
Pin Code	***391760***
Post Office Name	***Vaghodia***

VILLAGE INFORMATION:
Ropa village is located in Vaghodia Tehsil of Vadodara district in Gujarat, India and it has a total population of 633 peoples and about 127 houses.
The distance of ropa village from Vadodara is 13km and the distance form Vadodara railway station to ropa village is 23km and distance from Vadodara airport to ropa village is 18km.
The sarpanch of ropa village is Jyotiben rajubhai parmar and talati is Kanubhai.
There is one prathmikshala and aangandwadi.

FIG NO: 01 Satellite View Of Ropa Village

III. METHODOLOGY

After the site selection we have surveyed the village and according to the data collected during survey, following methods were used.

A. Population forecasting
B. Surveying of road by auto level
C. Collection of soil sample form site
D. Soil sample analysis and test
E. Design of flexible pavement

IV. RESULT AND ANALYSIS

A. SOIL BEARING CAPACITY OF SOIL:

The following tests are performed for checking the soil bearing capacity of soil;
1. Standard proctor test
2. California bearing ratio test

By performing standard proctor test we have obtained the value of OMC and MDD,
Optimum moisture content= 18.66%
Maximum dry density= 1.9 kg/m^3
By performing california bearing ratio test we have obtained the following result,
CBR for soaked soil at 2.5mm penetration is 3.04%
CBR = ((6*6.953/1370)*100)=3.04%
CBR for soaked soil at 5mm penetration is 2.706%.
CBR = ((8*6.953/2055)*100)=2.706%

B. QUANTITY OF CUTTING AND FILLING:

The quantity of cutting and filling is calculated with the help of reduced level of road.
The quantity of filling is 11973 cu.m and quantity of cutting is 4404 cu.m.

C. DESIGN OF FLEXIBLE PAVEMENT:

1. DESIGN TRAFFIC

$$N = \frac{365 \times [(1+r)^n - 1]}{r} \times A \times D \times F$$

Here; F = 0.75 (Two- lane single carriage way road)
A = 400 CPVD (Commercial vehicle per day)

D = 3.5 (From table-1 pg-12)
r = 0.075 (pg-14)(3.3-6.1)
n = 15yrs

$$N = \frac{365 \times [(1+0.075)^{15} - 1]}{0.075} \times 400 \times 3.5 \times 0.75$$

= 10.01 Msa (million standard axles)

2. TOTAL PAVEMENT THICKNESS

From soaked CBR test,
CBR value =3%
& N = 10.01 Msa
From fig 1; pg-8
Total thickness of pavement =760mm

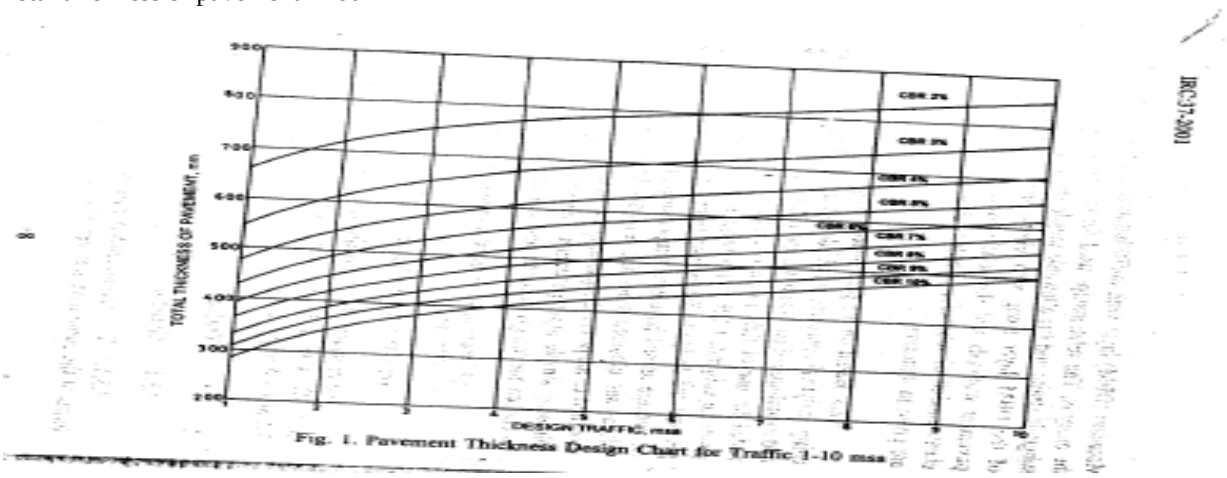


Fig. 1. Pavement Thickness Design Chart for Traffic 1-10 msa

3. PAVEMENT COMPOSITION

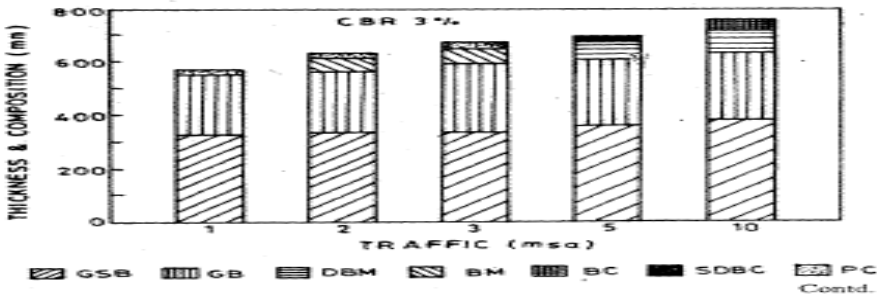
Pavement thickness = 760mm
Bituminous surface = 40BC + 90DBM
Granular base = 250mm
Granular sub base = 380mm
Taking side slope as 1.5:1 (as per IRC 36; clause 4.2 safe slope range between 1.1:1 to 2:1)

IRC:37-2001

PAVEMENT DESIGN CATALOGUE
PLATE 1 – RECOMMENDED DESIGNS FOR TRAFFIC RANGE 1-10 msa

CBR 3%

Cumulative Traffic (msa)	Total Pavement Thickness (mm)	PAVEMENT COMPOSITION			
		Bituminous Surfacing		Granular Base (mm)	Granular Sub-base (mm)
		Wearing Course (mm)	Binder Course (mm)		
1	550	20 PC		225	435
2	610	20 PC	50 BM	225	335
3	645	20 PC	60 BM	250	335
5	690	25 SDBC	60 DBM	250	335
10	760	40 BC	90 DBM	250	380



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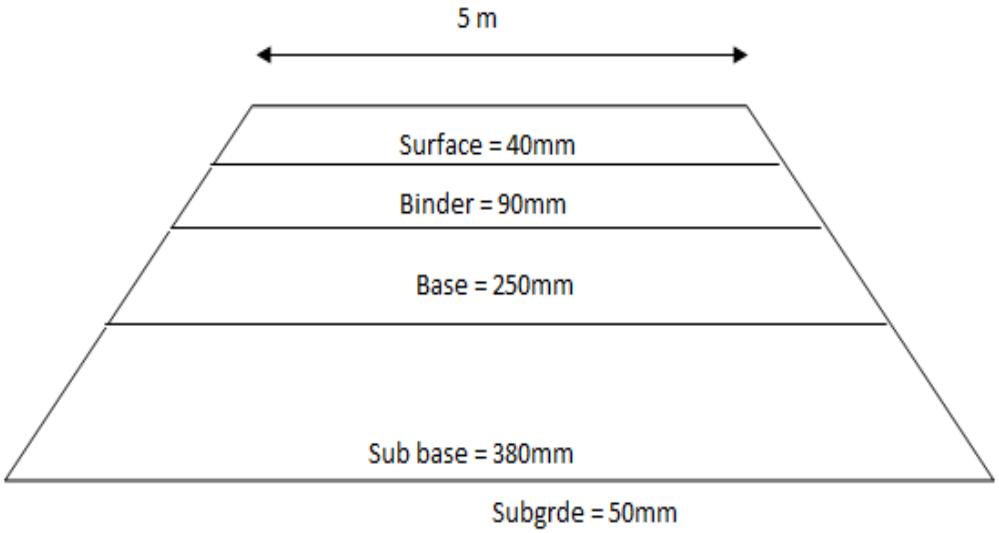
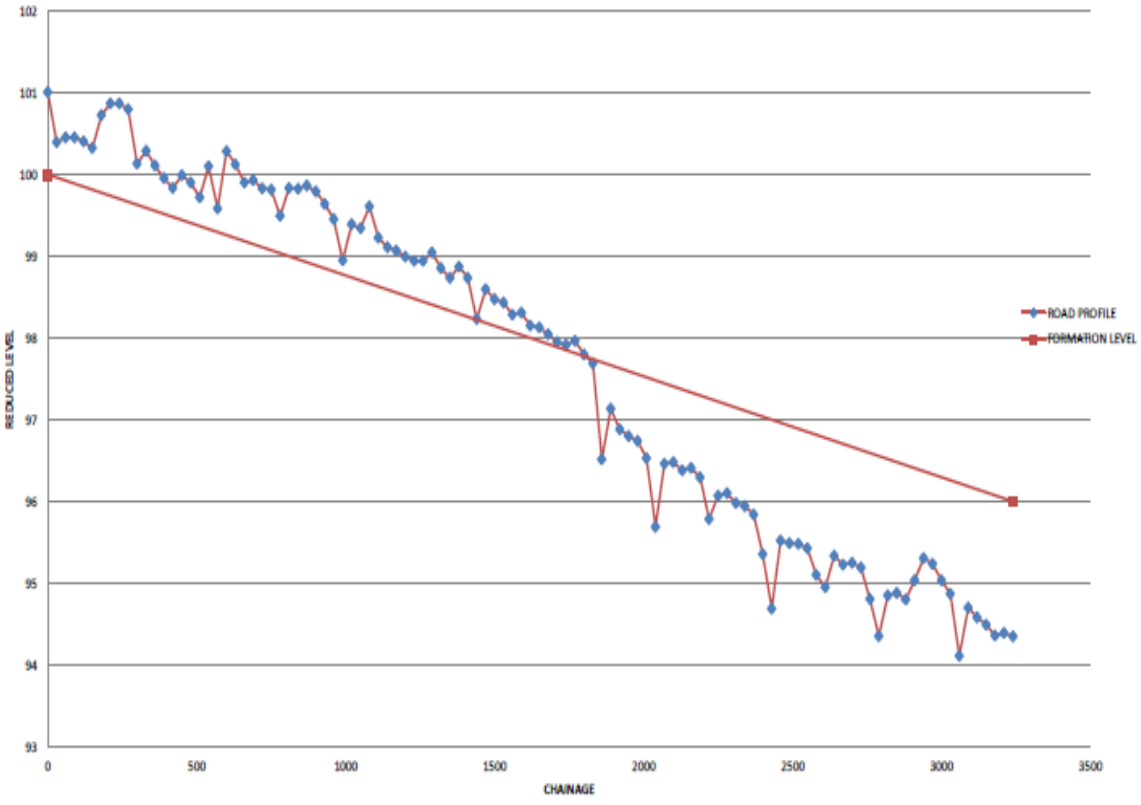
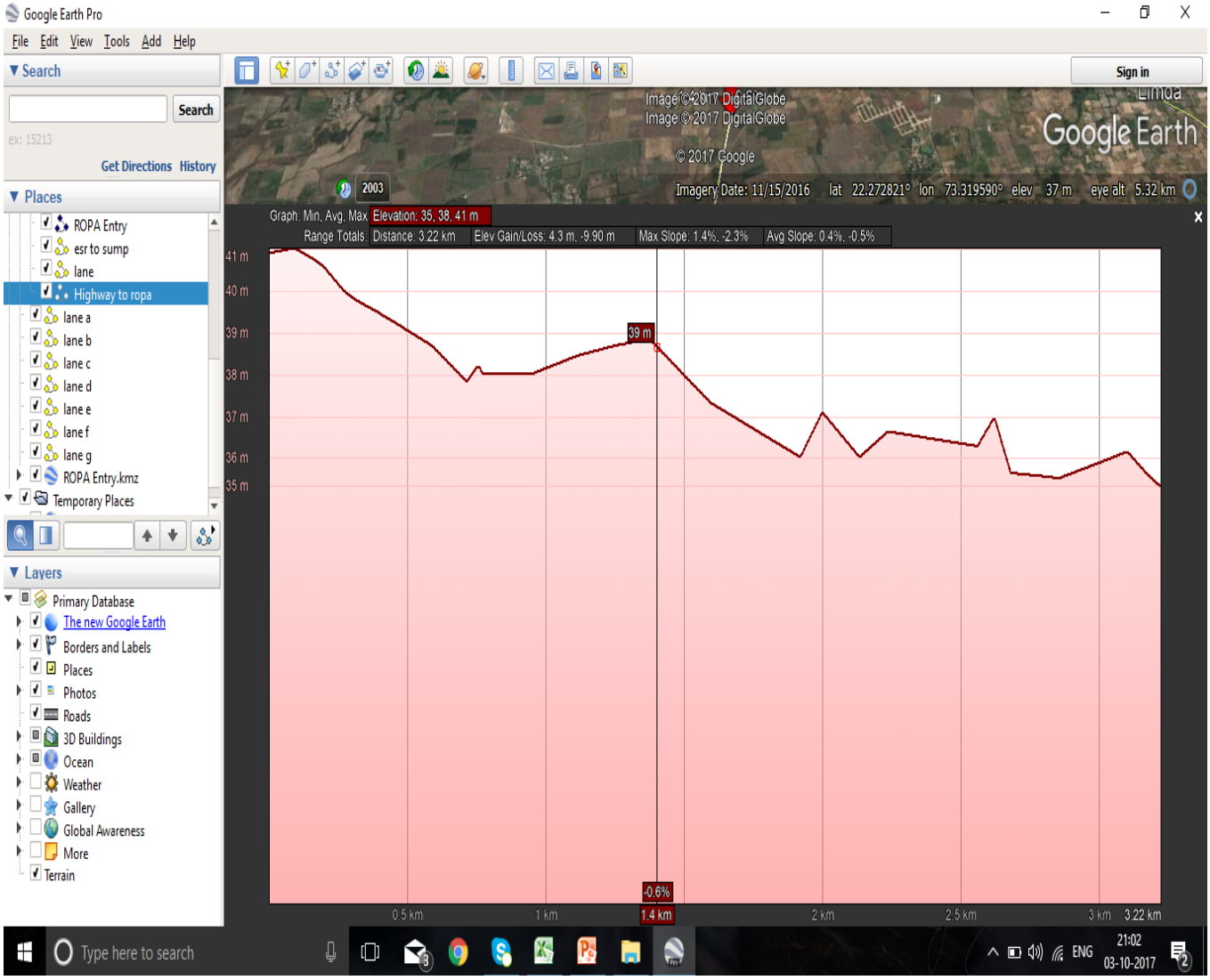


V. VALIDATION

We have used auto level to obtain the reduced level.



With the help of Google earth we have directly obtained the reduced level.



By comparing auto level reading and Google earth reading we came to know that the reading taken with the help of auto level is validated by Google earth, so in future if we want to construct the road Google earth software can be used.

VI. CONCLUSION

In present study various parameter is studied such as the current situation of village (ROPA).Existing structure, population etc. After study there infrastructure facilities primarily we propose the design of connecting road to ropa village with the length of 3.2km. And from the analysis design data the bituminous road type maybe recommended.