

## “ANALYSIS AND DESIGN OF MDR-34”

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**Abstract** - The important roads with a district connecting production and markets places with each other or with the main highways are known as 'Major District Roads'. The responsibility of construction and maintenance - district authorities and state government gives grant for development.

The Major District Road-34 (MDR - 34) is a Lasalgaon Patoda Yeola (423401) Road, These Road run through Yeola to Patoda, Our Project is on analysis and design of MDR-34, MDR-34 We are Analysing and designing of upto 3.740 km road from Kopargaon Yeola Road SH-10 to S.N.D polytechnic College campus.

These MDR-34 Road passing through College area so we are studying these road Keeping in view of these MDR - 34 road problem, We are suggest good remedial measures to do deal with project topic "Analysis and Designs of MDR-34. All types of operation we will conduct such traffic volume count, Collection of these road data, Take survey Like photography Survey and speed study etc. To Analyze on road traffic patterns, tread and traffic operations. Visit Yeola P.W.D for collecting Information regarding its, Testing on materials of soil, Aggregate and Bitumen etc. Data analysis. To suggest to develop a methodology of MDR 34 and suggestions of future Enhancement.

**Key Words:** MDR-34, Testing of materials, Traffic Operations, Design of MDR-34, Remedial measures of MDR-34, Photograph Survey

### 1. INTRODUCTION

The important roads within a district serving areas of production and markets and connecting these places with each other or with the main highways are known as Major District Roads (MDRs). The responsibility of construction and maintenance of these roads lies with District Authorities. However, the state government gives grant for development of these roads. The MDR has lower speed and geometric design specifications than for NH or SH.

The Major District Road-34 (MDR-34) is a run through Yeola-Patoda-Lasalgaon Road. The length of road is 32 kilometres. Our Project is an analysis and designing of MDR 34 form S.N.D College Campus to Yeola road upto 3.740 kilometre road. These MDR 34 Road passing

through College area so we are studying these road Keeping in view of these MDR-34 road problem. We will be suggest good remedial measures to do deal with project topic "Analysis and Designs of MDR-34".



Fig -1:MDR-34

### 2. LITERATURE REVIEW

**2.1 Vidya V And Anju k (July 2021):**In the implementation of MDR construction projects always risk arise. These risks have greater impact on the execution of the projects, the community of road users and the surrounding environment. These risks have to be studied, managed and assessed as a risk-mitigation effort. Risk identification is thus the first step in risk management process. Descriptive method used in this project identification of variable risk using considering social, technical, economical, political, legal and environmental risks.

**2.2 Vasu Choube And Prof. Jitendra Chouhan (June 2021):**We know that as the increment in population is directly connected to increment in vehicles. And if number of vehicles increase number of accidents is also increased. The reason of accidents are road parameters or human error. We find out from the previews analysis of data that 66% accidents are occur due to human errors and 33% due to the parameters of road. We have 3.3 million km network in India which consist all types of road just like National Highway (NH), State Highway (SH), Major District Road (MDR) and other District Road (ODR)

**2.3 Dhanavath Seva, Bhukya Chandrashekar And Faria Aseem (November 2017):**In a National Highway project, the engineer has to plan, design and construct either a

network of new roads or road link. Once a highway is constructed, development takes along the adjoining land and subsequent changes in alignment in geometric standards become very difficult. A badly aligned highway is not only a source of potential traffic hazard, but also causes a considerable increase in transportation cost and strain on the drivers and the passengers.

**2.4 Mridula G M,Ashamol Jose And Lidiya P M (November 2016)** :Accidents are not natural but they are caused' is a common cliché in the area of traffic safety. Thus if accidents are caused by some, surely the ones responsible for could be identified and appropriate remedial measures should be developed and implemented to the extend feasible. Various traffic studies such as details of road inventory, signage inventory, traffic volume, pedestrian volume count, spot speed, speed and delay, accident study etc helps in suggesting the improvement measures. Accident data collection helps to identify the cause and type of vehicles involved in the accident. This helps in suggesting measures based on design or other conditions.

**2.5 Naveen.N And D.V.Manoj Kumar (May 2016)**:Road Transport is vital to India's economy. India's road network carries over 65 percent of its freight and about 85 percent of passenger traffic. Flexible pavement is composed of a bituminous material surface course and underlying base and sub base courses. W.B.M is one type of flexible pavement. When a fast moving vehicle passes over a W.B.M road, the slurry of Murom is sucked out by the pneumatic wheel tires. The stone pieces get disturbed and finally the road su face is disintegrated. Thus the W.B.M roads are not suitable for fast moving vehicles with the wheel Tires.

### 3. OBJECTIVE OF PROJECT

- The main object of our project is to Analysis and Design of MDR-34.
- To design the existing pavement.
- Strength, weakness, opportunity and threat of projects can be identified.
- To carry out analysis of black spots using photography survey and visual inspection.
- To judge the suitability of existing route.
- To study present condition and parameters of road such road conditions,road features,block spot etc.
- To Analyse on road traffic patterns, tread and traffic operations.etc

- To conduct various types of test on Materials.
- To ensure safety for student and pedestrian.
- To suggest to develop a methodology of MDR 34.

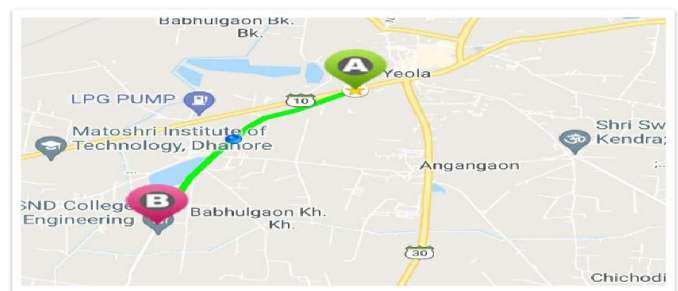
### 4. METHODOLOGY

In these topic include the contain of analysis of MDR-34,Study area, Road measurement ,condition of existing pavement, traffic volume count and spot speed study

#### 4.1 ANALYSIS OF MDR-34

##### 4.1.1 Study Area

The study area lies at Yeola Taluka, District-Nashik, Maharashtra. The location of study can be seen in following fig from A point (Lasalgaon Patoda Yeola Road And Kopargaon Yeola Road Connection) B Point (S.N.D polytechnic College campus),The distance between A and B point is 3740m



**Fig -2:** Study Area

##### 4.1.2 Road Measurement

The distance between two roads point or place measures with the help of tape, Metric chain, rodometer etc it's know as Road measurement.



**Fig -3:** Road Measurement

- **Pavement Width:-**5.75m
- **Length:-** 3740m
- **Side Path:-**0.9m
- **Thickness of Pavement:-**575mm

##### 4.1.3 Condition Of Existing Pavement

During we have been visited site for quite a number of times. The exiting road is is in Good condition but Some

places we have found various defect in these route. There are very few sign boards on the road and are in very bad condition. The riding quality on the whole stretch is some places is bad. There are no road signs and markings being done on the road. Drains are also improper along the existing highway. Both side area of these road is less. Some are the following pictures which I took during my visits on the site can give the outlook of the highway.



Fig -4: Existing condition of MDR-

#### 4.1.4 Traffic Volume Count

It is define as the survey of number of vehicles and Pedestrians crossing section of road per unit during any selected period.

#### Survey Of Traffic Volume Count

##### ENUMERATORS RECORD-MORNING SLOT

**Name Of Approach:-**S.N.D Polytechnic. **Location:-**Bhabulgaon  
**Road Type:-**MDR-34 **Date:-**21 October 2021  
**District:-** Nashik **State:-**Maharastra  
**Starting Hour:-**09:00am **End Hour:-**10:00am

Table -1: Morning slot counting

MORNING SLOT COUNTING		
Vehicle Category	Left Turning	Right Turning
Bus	12	19
Car	123	192
Cycle	15	34
Two-Wheelers	392	549
Three-Wheelers	70	17
Animal Driven Vehicle	-	-
Other	-	-
<b>Total</b>	<b>612</b>	<b>811</b>

##### ENUMERATORS RECORD-AFTERNOON SLOT

**Name Of Approach:-**S.N.D Polytechnic. **Location:-**Bhabulgaon  
**Road Type:-**MDR-34 **Date:-**22 October 2021  
**District:-** Nashik **State:-**Maharastra  
**Starting Hour:-**01:00pm **End Hour:-**02:00pm

Table -2: Afternoon slot counting

AFTERNOON SLOT COUNTING		
Vehicle Category	Left Turning	Right Turning
Bus	09	13
Car	134	136
Cycle	05	11
Two-Wheelers	177	224
Three-Wheelers	15	31
Animal Driven Vehicle	-	-
Other	-	-
<b>Total</b>	<b>340</b>	<b>415</b>

##### ENUMERATORS RECORD-EVENING SLOT

**Name Of Approach:-**S.N.D Polytechnic. **Location:-**Bhabulgaon  
**Road Type:-**MDR-34 **Date:-**23 October 2021  
**District:-** Nashik **State:-**Maharastra  
**Starting Hour:-**04:30pm **End Hour:-**05:00pm

**Table -3:** Evening slot counting

EVENING SLOT COUNTING		
Vehicle Category	Left Turning	Right Turning
Bus	28	13
Car	158	137
Cycle	27	16
Two-Wheelers	349	305
Three-Wheelers	37	8
Animal Driven Vehicle	-	-
Other	-	-
<b>Total</b>	<b>599</b>	<b>479</b>

**Table -4:** Classification of vehicles based on speed

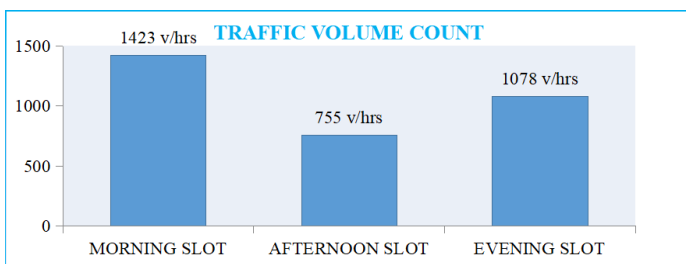
Speed Range(kmph)	Types of Vehicle
0-10	Nil
10-20	Nil
20-30	Cycle, Tractor, Autorickshaw
30-40	Cycle, Tractor, Autorickshaw, Truck
40-50	Car, Bus, 2-wheeler, Taxi
50-60	Bus, Car,

**5. DETAILS OF DESIGN, WORKING AND PROCESS**

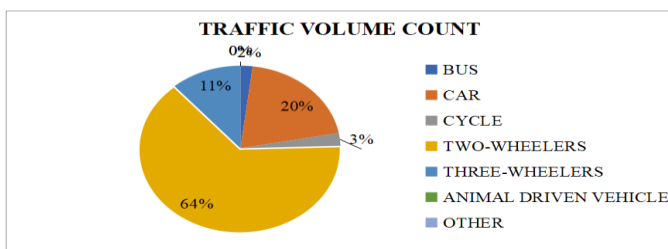
**5.1 Design Of Flexible Pavement**

In these we chapter include the design of flexible pavement, various type of test conducted on material such as aggregate, soil and bituminous. And test must be crushing test on aggregate ,aggregate impact test, soil visual inspection test, casagrande test ductility, test on bituminous etc

**Traffic Volume Count Survey Record Analysis**



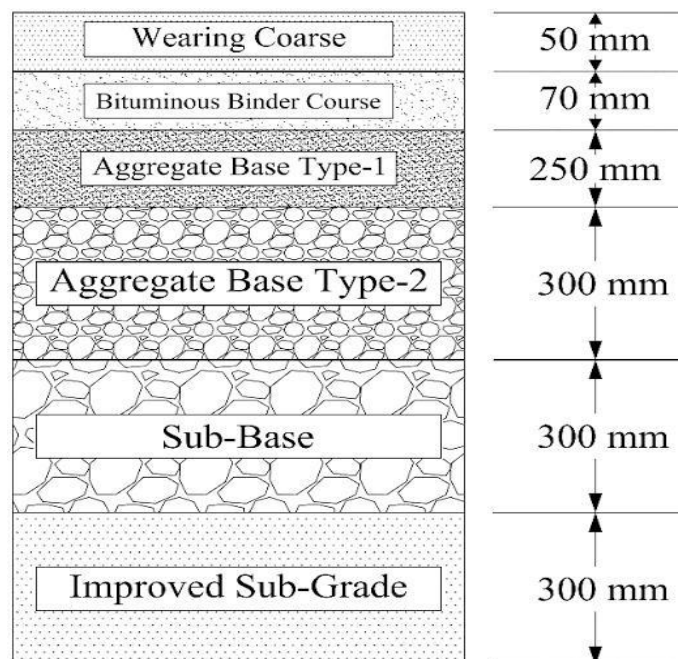
**Chart -1:** Traffic Volume Count



**Chart -2:** Percentage of Vehicle Run On MDR-34

**Spot Speed Study**

Spot speed is referred to as the instantaneous speed of a vehicle at a point or a cross section. The classification of vehicles according to speed range is as follows



**Fig -5:** Design Of Flexible Pavement

## 5.2 Design Rate And Material

**Table -5:** Measurement Sheet

Sr No	Particulars of Item	Quantity (m <sup>3</sup> )	Unit	Rate	Amount (Rs)
1	Sub-Grade	10098	m <sup>3</sup>	916	9249768
2	Hard Shoulder	981.75	m <sup>3</sup>	4743	4656440.25
3	Sub-Base	10098	m <sup>3</sup>	4361	44037378
4	Aggregate Base Type-2	10098	m <sup>3</sup>	4732	47783736
5	Aggregate Base Type-1	8415	m <sup>3</sup>	6566	55252890
6	Bituminous Binder Course	2356.2	m <sup>3</sup>	19906	46902517.2
7	Wearing Course	701.25	m <sup>3</sup>	20118	14107747.5
Total Cost					221,990,477Rs

**Table -6:** Abstract Sheet

Sr No	Particulars of Item	No	Length (m)	Width (m)	Height (m)	Quantity (m <sup>3</sup> )
1	Sub-Grade	1	3740	9	0.3	10098
2	Hard Shoulder	2	3740	2.625	0.05	981.75
3	Sub-Base	1	3740	9	0.3	10098
4	Aggregate Base Type-2	1	3740	9	0.3	10098
5	Aggregate Base Type-1	1	3740	9	0.25	8415
6	Bituminous Binder Course	1	3740	9	0.07	2356.2
7	Wearing Course	1	3740	3.75	0.05	701.25
Total Quantity of Material						42748.2m <sup>3</sup>

## 5.3 Testing On Material

### 5.3.1 Test On Aggregate

#### Impact Test Of Aggregate:-

It is the ability of aggregates that resist sudden impact or shock load on it. Also, it can be defined as the resistance of aggregate to failure by impact load is known as the Impact Value of Aggregate.

#### Procedure Of Aggregate Impact Test:-

- 1) Sieve the material through 12.5 mm and 10.0mm IS sieves. The aggregates passing through 12.5mm

sieve and retained on 10.0mm sieve comprises the test material.

- 2) Pour the aggregates to fill about just 1/3 rd depth of measuring cylinder.
- 3) Compact the material by giving 25 gentle blows with the rounded end of the tamping rod.
- 4) Add two more layers in similar manner, so that cylinder is full.
- 5) Strike off the surplus aggregates.
- 6) Determine the net weight of the aggregates to the nearest gram(W).
- 7) Bring the impact machine to rest without wedging or packing up on the level plate, block or floor, so that it is rigid and the hammer guide columns are vertical.
- 8) Fix the cup firmly in position on the base of machine and place whole of the test sample in it and compact by giving 25 gentle strokes with tamping rod.
- 9) Raise the hammer until its lower face is 380 mm above the surface of aggregate sample in the cup and allow it to fall freely on the aggregate sample. Give 15 such blows at an interval of not less than one second between successive falls.
- 10) Remove the crushed aggregate from the cup and sieve it through 2.36 mm IS sieves until no further significant amount passes in one minute. Weigh the fraction passing the sieve to an accuracy of 1 gm. Also, weigh the fraction retained in the sieve.
- 11) Compute the aggregate impact value. The mean of two observations, rounded to nearest whole number is reported as the Aggregate Impact Value..

### 5.3.2 Testing On Soil:-

Soil testing is a very important part of building and road construction. In fact, no construction project can proceed without first making sure the soil can support the load. Thus, the purpose of soil testing for construction is to determine the suitability of the soil for the type of construction to be done. The test is also done to determine the presence of groundwater.

#### Field Identification Of Soil:-

Field identification of soil is one of the important steps in soil investigation. It includes visual examination, dilatancy, toughness, dry strength, organic content and shine test. Based on the size of soil particles soil can be gravel, sand, silt or clay.

**Table -7:** Field Identification Of Soil

Sr.No	Name of field Identification Test	Observations
1	Visual inspection test	Clay
2	Dilatancy test	Minimum
3	Toughness	Tough
4	Dry Strength test	High to medium

**5.3.3 Ductility Test On Bitumen:-**

The Ductility Test of Bitumen is one of the important tests of bitumen which is essential before using it in road construction. The Ductility Test of Bitumen was used to measure the adhesive and elastic properties of any bitumen sample.

**The Procedure of Ductility Test of Bitumen:-**

The ductility test of bitumen is carried out in two steps  
 Sample Preparation: In this step, the bitumen sample is filled in the briquette mould after melting it.  
 Testing of the Specimen: In this step, the bitumen sample taken in the mould is tested for its ductility in the ductility testing machine.

**Observations**

Observation	1	2
(a) Initial Reading	0	0
(a) Final Reading	74	77

Average of specimen is 75.5cm

**6. RESULT**

**Table -8:** Rate Analysis

Sr. No	Materials	Quant(m <sup>3</sup> )	Rate	Amount(Rs)
1	Sub-Grade	10098	916	9249768
2	Hard Shoulder	981.75	4743	4656440.25
3	Sub-Base	10098	4361	44037378
4	Aggregate Base Type-2	10098	4732	47783736
5	Aggregate Base Type-1	8415	6566	55252890
6	Bituminous Binder Course	2356.2	19906	46902517.2
7	Wearing Course	701.25	20118	14107747.5

- Total Quantity of Pavement is **42748.2 m<sup>3</sup>**
- Total Cost of Amount is **221,990,477 Rs**

**7. CONCLUSION**

The project deals with the “Analysis and Design Of MDR-34” of form Lasalgaon Patoda Yeola (423401) Road from Kopargaon Yeola Road to S.N.D polytechnic College campus upto 3.740 Km. Form the study following conclusion can be drawn:-

1. After analysis MDR-34 we have conclude that its not as per IRC.
2. Improper road side board.
3. Maintenance and repair of the route is require.
4. After Traffic volume count we conclude that at the time of college start then that time increase the vehicle.
5. Mostly two-wheeler are run throw these route.
6. To require increase safety for student and pedestrian.
7. Require plan signals and sidewalk etc. for student and pedestrian.
8. Its require design shoulder.
9. Its require to extend the width of route because the population of city and colleges day to day increase

**8. RECOMMENDATION**

1. Remove or repair potholes for the safety of road users.
2. Provide footpath on both the sides of the road for the safety of pedestrians.
3. Take suitable enforcement measures to reduce the speed of vehicles.
4. Good quality materials should be used so as increase the life of the roads
5. Provide shoulders for its
6. Extend the width of route
7. Maintenance and repair

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Finally, before ending we would like to once again our gratitude and thanks to our family and friends for their comments, suggestions and criticism and who are involved directly and indirectly in making our project success.

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