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Accommodation of Safety Edge to Minimize Road Accidents

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ABSTRACT: Road accidents are the causes of death worldwide more than 1.5million are killed in road accidents worldwide. The occurrence of accident depends on like geometrics of road, vehicle, pavement condition and whether condition. When a vehicle leaved the travelled way and encounter a pavement shoulder drop-off, it can be difficult for driver to return on roadway. The side of the tire may scrub along the drop-off resisting the driver's attempts the steering angle of vehicle 'slingshot' across the road. This can result in collision with other traffic or loss of control on roadside. The safety edges are innovation treatment intended to minimize drop-off related crushes.
It has been noticed that potholes are also the main cause of accidents. To reduce these accidents rates occurring due to the portholes on pavements the chipfill system is developed.

I. INTRODUCTION

In today's world road and transport has become an integral a part of growth and development of a nation. Everybody may be a road user in one or other shape. This transport system has minimized the space but it's on the opposite hand increased the life risk. Every road crashed end in loss of lakh of lives and high to injuries to corers of individuals. India features a total of about 2 million kilometers of roads out of which 960,000 km are surfaced road and about 1 million km of roads in India are of poor quality.

As we experience increase in number of vehicles on road simultaneously road accidents also are increasing in same manner. Road accidents are one among the most important killers in India.
To deal with this accommodation of safety edges on pavement is developed. We notice that due to resurfaced pavements and edges on it also results in increasing the accidents rates. Safety edges make it easier for a driver to safely reenter the road way after in inadvertently driving on to the shoulder. Potholes are the cause of accidents and due to this fatal rates and injuries occurs. Overturning and turning of vehicles also may result. To deal with this chip-fill system is developed. Many road crews are ill-informed on the proper materials and methods for pothole repair. Correct selection of pothole patching materials and proper application of repair procedures can greatly increase the longevity of pothole repairs, lead to fewer driver frustrations, and lower road maintenance budgets.

II. LITERATURE REVIEW

Theconceptof safety edge wasfirstintroduced by ***Gregory A. Howell1***,1) ***Gregory A. Howell1*** Worked on Working near the edge: A new approach to construction safety in august 2000, Development security has drastically improved, yet has arrived at a level .2)***Krammes, R., Brilon, W. (Eds.)*** has worked on Safety in geometric design standards 1: Three Anecdotes. June 14-17, 2000. Many accept that streets planned to guidelines are protected streets. In the partner paper the case will be made that such streets are neither safe nor dangerous; that their security is unplanned3) ***Keith W. Anderson***, Worked on Pavement Edge Treatment January 2013,Four projects were built over two construction sites using special devices attached to the asphalt machine that produces a 30° slope on the outside pavement edge in place of the near vertical drop-off common with conventional paving equipment.4)***Zheyuan Wang, Member IEEE,*** 2018 has conducted study on Road Edge Detection in All weather and Illumination via Driving Video Mining, To obstruct the vehicles running through countryside, street edge location is a key function. Current work on street edge identification has not perfectly handled all climatic as well as environmental conditions..5) ***Megan S Ryerson***, has Worked on Safety Edge: a Safely Frame Work to Identify Edge Conditions in the Future Transportation System with Highly Automated Vehicles, July2019Atomized driving frameworks (ADS) have the potential for improving security yet also represent

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the danger of expanding the transportation framework past its edge conditions, past the working conditions (operational plan space (ODD)) under which a given ADS or highlight Connected is expressed voluntarily to work.

III. METHODOLOGY

For the development of safety edge on pavements the recycle material are used that's coconut shell and e-waste this Material are economical and reduces the value of construction.

Safety edge is provided to securely re-enter the roadway after inadvertently arriving on to the shoulder .Various analysis are made on the traffic flow to detect the accidents rates increasing in day to day life .Analysis are supported location and supported the time were made .his analysis were made to scale back the accident rates and to makes traffic moments safe.

Chip fill is hot applied surface defect repair system specially designed to repair cracks and holes within the road. Firstly the broom and burner is applied on holes in road within the road. When heated, the chip fill thermoplastic becomes fluent, and therefore the binders in material find to the bitumen in asphalt. Chip fill may be a specially designed thermoplastic for repairing cracks and smaller holes with diameter around 15-20 cm and minimizing the danger of defects getting bigger. The repairing time is about 20 minutes from street to opening for traffic. This is the time reducing method which fills the potholes within minutes of time and this result in reducing the accident rates and also reduces the turning and overturning of the vehicles which may occurred due to the potholes on pavement.

Fig.1: Side Edge Of Kalmeshwar road

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Fig 2: Potholes on Kalmeshwar Road

IV. OBSERVATION

As we experience increase in number of vehicle in road simultaneously road accidents also increase in same manner.Road accidents are one of the biggest killers in india.So to analyse road accidents we collected data from varies states of india .

The below figure shows the accidents rates in varies states in india.

Sr no.	2020		2021
Share of 13 States	Percentage share	Number of Road Accidents	Number of Road Accidents
Tamil Nadu	14.9	71431	69059
Madhya Pradesh	11.2	53972	54947
Karnataka	9.2	44403	44011
Maharashtra	8.3	39878	63805
Kerala	8.2	39420	39014
Utter Pradesh	7.4	35612	32385
Andhra Pradesh	5.2	24888	24258
Rajasthan	4.8	23066	24072
Telangana	4.7	22811	21252
Gujrat	4.5	21859	23183
Chhattisgarh	2.8	13580	14446
West Bengal	2.8	13580	13208
Haryana	2.3	11234	11174

Table 1 shows the yearly as well as the state wise percentage accidents.

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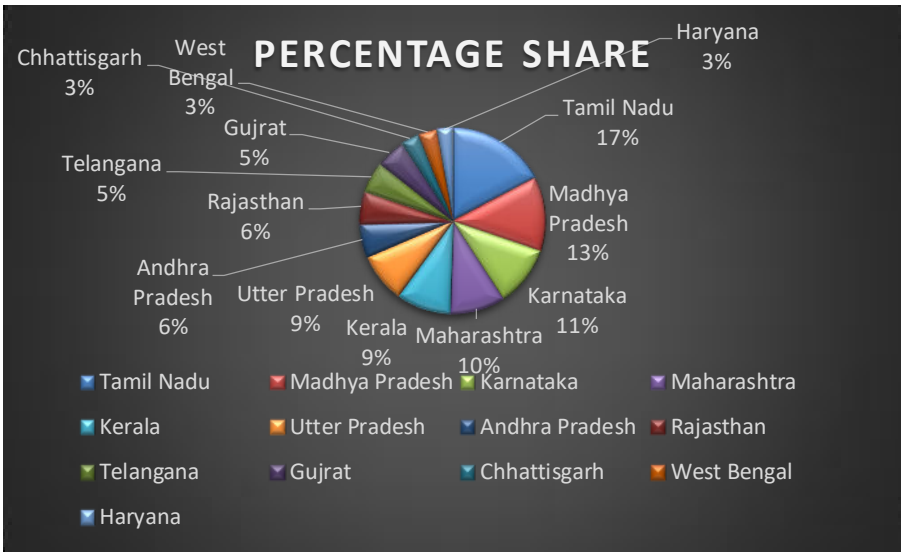

Fig 3 shows accidents rate distribution.

	TIME				
	9-10am	11-12pm	1-2pm	5-6pm	6-7pm
DAYS	Traffic volume count				
Monday	42.2	39.41	35.46	40.85	41.13
Tuesday	55.08	38.75	33.06	39	38.83
Wednesday	51.91	38.58	30.45	43.5	40.08
Thursday	43.9	40.85	41.43	44.65	43.63
Friday	51.73	31.65	55.28	40.65	36.03
Saturday	53.83	31.65	55.28	40.65	36.03
Sunday	42.95	37.05	33.25	42.21	47.06
average	48.8	36.84	40.60	41.64	40.39

Table 2 shows that the time according to the days, the volume of the traffic flow as per hour, this is as per the selected location.

Year/ spots	Katolnaka	kalmeshwar	sadar	Gaddigudam
2017	127	189	120	90
2018	147	219	135	120
2019	170	245	110	138
2020	184	254	130	147

Table 3 shows the analysis based on road accidents occurred on the various spots.

Pot holes:-

- By using the chip fill method, we can avoid accidents on the roads.
- Because of quick filling the flow of vehicle, the vehicles can go smoothly and safely and there are less chances of accidents.
- As this method is quick and easy there is no time consumption. Its way easier and quick.
- There are having 4 methods used in chip fill method:-
- Throw and go
- Throw and roll
- Semi-permanent
- Spray –injection

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- **Instarmac**:- firstly the aggregate is dumped into the pot holes .then the stamping is done on the pot hole on which the aggregate is put .then the spray is applied on the edge on the dry surface of potholes to get the strong bonding at the edge. Then the premix material is added on the pot hole and then compacted with the use of stamper. As soon as the stamping is done the traffic or vehicles is ready to go through the road.

Sr no.	Methods	How its applied	Cost	Time
1	Throw and go	Compaction is left up to traffic	Low	1-2 mins
2	Throw and roll	Compacted using truck tyres	Low	1-2 mins
3	Semi- permanent	Compacted using vibratoery plate compactors	High	1-2 mins
4	Spray injection	No compaction needed	High	1-2 mins

Table 4 shows the differences between the methods according to the various aspect

V. RESULT & CONCLUSION

The safety edge treatment is suitable for use by highway agencies under a broad range of conditions on two-lane highways. While the evaluation results for total crashes were not statistically significant, there is no indication that the effect of the safety edge treatment on total crashes is other than positive

The cost-effectiveness of the safety edge treatment increases with increasing traffic volumes. The effect of the safety edge treatment would be cost-effective for two-lane highways.

The cost of adding the safety edge treatment to a resurfacing project is minimal. Overall project costs and the overall cost of asphalt resurfacing material did not increase for resurfacing projects with the safety edge compared to resurfacing projects without the safety edge.

The four most commonly used techniques for pothole patching are throw-and-go, throw and- roll, semi-permanent, and Chip Fill and the costs associated with each type of pothole patching can be broken into materials, labor and equipment.

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