



# INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

A PATH FOR HORIZING YOUR INNOVATIVE WORK

## APPLICATION AND METHODOLOGY OF REPAIRING AND MAINTENANCE OF POTHoles USING MODERN TECHNIQUES IN FLEXIBLE PAVEMENT

BHRUGU KOTAK<sup>1</sup>, ABHIJITSINH PARMAR<sup>2</sup>, DHAVAL M PATEL<sup>1</sup>, BHUPESH KATARIYA<sup>1</sup>,  
PRIYANK B SHAH<sup>1</sup>

1. Head & Assistant Professor, Department of Civil Engineering, SVBIT, Gandhinagar.

2. Assistant Professor, Department of Civil Engineering, SVBIT, Gandhinagar.

Accepted Date: 19/11/2014; Published Date: 01/12/2014

**Abstract:** Failure in pavements takes place because of shearing, loading and deflection of materials. Which is the result of the action of traffic, poor support, and adverse atmospheric condition. Generally the pavement failure is done because the water get entry, the presence of water in pavement will ultimately result in pavement deterioration. If the pavement has cracked, the water can easily enter which will lead to failure of it. To repair this failure of pavement, transportation agencies adopting the easier method like, "throw and go". This application relates to a method for easy and efficiently filling a pothole in a road surface of flexible pavement. This method includes water barrier to prevent the entry of water to bottom surface of the road. Geo-sheet will be provided as a water barrier and epoxy will be used to get better result.

**Keywords:** Potholes, Flexible Pavement

Corresponding Author: MR. ABHIJITSINH PARMAR



PAPER-QR CODE

Access Online On:

[www.ijpret.com](http://www.ijpret.com)

How to Cite This Article:

Abhijitsinh Parmar, IJPRET, 2014; Volume 3 (4): 121-127

## INTRODUCTION

It is the failure in flexible pavement, which is the result of presence of water and heavy axle load. The water can get entry through seepage or rain water.

Failure in pavement can be result of low quality of material, poor workmanship, repeated loading, weather condition, or it may be take place by the combination of these factors. But in the most cases the failure is caused due to intrusion of water. The presence of water in a pavement will result into early pavement deterioration.

### 1.2 Causes of potholes:

Generally, it starts with poor quality of material and poor workmanship, and then the pavement gets weakness, in this weak area of the pavement, if the heavy loads due to traffic lead to an excessive bending of the pavement, this will create crakes on the pavement, once the crakes are developed water can easily enter and will gradually lead to the saturation of various layers of the material, then the pavement not able to support heavy loads more.

### 1.3 Effects of potholes:

These are the serious effects of potholes , the accident rate are increased , the appearance of road is also affected, speed of vehicle will decrease so the travel time will increase, so it is need to repair this potholes and for that government is wasting so much money for it but it needs proper method to be repaired.

### 1.4 Material:

In flexible pavement, we are using these materials:

- Aggregates
- bitumen
- sand

But for the proper repairing of potholes, we used epoxy and Geo Synthetic Sheet.

## 2. Application of Geo Synthetic Sheet:

### 2.1 process of making mould:

Aggregate, sand, bitumen are used to make the regular mould. First of all mixture of 20mm and 10mm aggregate was taken and heated for few minutes than sand is applied in this mixture. After that bitumen is heated till it converts in the liquid form, than the mixture is applied on this bitumen and we make it homogenous.

Than this material is placed on the sieve and after 24 hours it was taken for the test. Same procedure was repeated for the mould with geo-sheet but before placing the mixture on sieve we have to place a geo-sheet at the base of sieve. For the application of epoxy we used it in the mixture as well as we made a layer of it on the top surface of the mould.

### 2.2 Test method (water absorption test)

We did two tests on these moulds which are as under.

- Application of water by sprinkler method.
- Applications of water by submerge method.

### 3. Sprinkler method

In this method two samples were taken, sample no.2 (normal) and sample no.3 (geo sheet & epoxy). One by one mould was kept at particular place and the water is applied by sprinkler method for 30 min. and we measure the weight of mould before and after application of water. Thus we got the result as under.

Table – 1 Sample mix deign

Sample no.	20 mm Aggregate	10 mm Aggregate	sand	Bitumen	Geo sheet	Epoxy
1	0.9	0.6	0.380	0.120	-	-
2	0.9	0.6	0.380	0.120	140 micron	Dr.fixit



Fig -1 Normal Mould



Fig -2 Mould with Epoxy and Geo-sheet

Table 2 Weight Comparisons

Condition	Wt. of sample(kg)	normal	Wt. of sample with geo sheet and epoxy (kg)
Normal	2.010		2.075
After applying water	2.054		2.105

Table – 3 Water absorption

Sample	Total weight of absorbed water(kg)
Sample 1	0.044

Sample 2

0.030



Fig – 3 Sprinkler method arrangements

#### 4. Submerge method

In this method the mould was submerged in the water for 30 min. and then the weight of both moulds were compared. The weight of mould was taken before and after application of water.

Table – 4 Sample Mix Design

Sample no.	20mm Aggregate	10mm Aggregate	sand	Bitumen	Geo sheet	Epoxy
1	0.9	0.6	0.380	0.120	-	-
2	0.9	0.6	0.380	0.120	140 micron	Pidipoxy EP + ESL



Fig-4 Geosheet mould and normal Mould

Table – 5 Weight Comparision before and after test

Condition	Wt. of normal sample(kg)	Wt. of sample with geo sheet and epoxy (kg)
Normal	2.218	2.408
After applying water	2.293	2.458

Table – 6 Weight water absorbed

Sample	Total weight of absorbed water(kg)
Sample 1	0.075
Sample 4	0.050

## 5. CONCLUSION:

In India, the method which is using to repair the potholes does not give durability, because, the portion which is repaired gets seepage through the base and top surface gets water entry from sources like rain, ice. Which will again damage the work and bonding would reduce thus durability will reduce and again we have to apply same method to repair it. So here we applied

the geo sheet to reduce the seepage and epoxy to reduce the water entry. The application of geo sheet in potholes repairing work gives durability to the work. After applying it, the seepage through base will reduce which will improve the durability of repaired pothole. Same as for epoxy it gives well resistant for water entry from the top surface. So, our assumption “geo sheet is able to reduce seepage from base in application of pot holes repairing method” is correct.

## **REFERENCES**

1. Raymond Wells “Asphalt Repair Method Utilizing Chilling “P\_O\_Box 257, Mayo, Nov. 3, 1998
2. Ricky G. Tucker, Woodstock, Ga (Us); Kevin Stramara, Chantilly, Va (US); Alan Cornet, Andover, Us “Method And System For Repairing Potholes In Roads” Honeywell International Inc. 101 Columbia Road, P O Box 2245 Morristown, NJ 07962-2245 (Us) In April 2009.
3. Timothy Geary “Pot Hole Repair Patch and Method of Installation” Camarillo, Ca (U S) In June 2013.
4. Ransome J Wyman “Roadway Repair and Maintenance” Palmas, Laguna Niguela Ca (Us) 92677 In April 2009.
5. Carl L. Sterner “Pothole Patcher” Bakersfield, Calif: 93309 in April 1985.
6. Dennis J. Gregerson “Pothole Repair System “Waubay, SD Us, In April 2011.
7. Jerome Lemelson,” Method And Apparatus For Road Hole Repair “Incline Village, In Nov. 1994.