

Module 13: **MAINTENANCE TECHNIQUES - THE ROUTINE MAINTENANCE 2**

Objectives

After fulfilling Module 13, you will be able to:

- Comprehend the procedure and techniques in implementing the Routine Maintenance 2.
- Distinguish the wrong/right steps in each maintenance technique.
- Self - Assessment.

Requirement

The participants must comprehend the following modules

- Module 1: "*Local Road Network*"
- Module 2: "*The Concepts of Rural Road Maintenance*"
- Module 4: "*Rural Road Defects and the Causes*"
- Module 11: "*Rural Road Maintenance Materials*"

Methodology

- The participants are introduced the procedure and techniques in implementing activities of the Routine Maintenance 2.
- The participants view some maintenance techniques, distinguish the wrong/right steps in these maintenance techniques.
- Self - Assessment.


Facilities-Materials


- Rural Road Maintenance Handbook
- Module 12 "*Maintenance Techniques- The Routine Maintenance 2*"




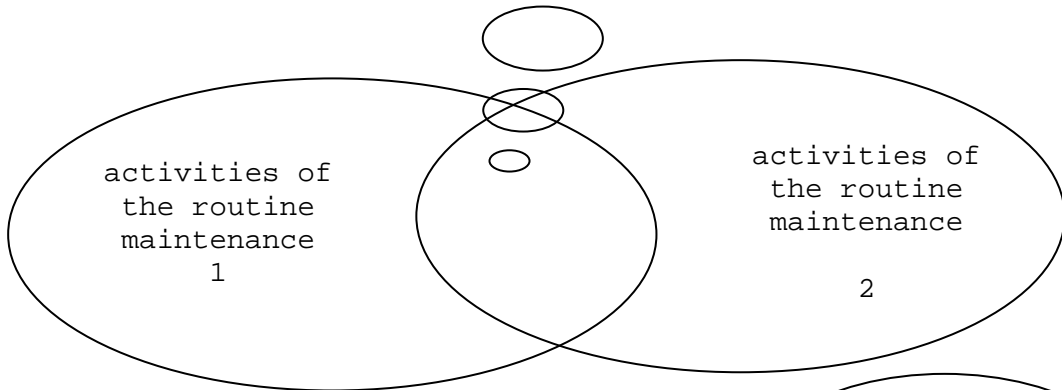
1. Learn about the procedure & techniques to carry out activities of the Routine Maintenance 2
2. View & realize the wrong/right steps in procedure to implement some activities of the Routine Maintenance 2.
3. Self - assessment

1. Procedure and technique to implement some activities of Routine Maintenance 2

 **Learn about** features of Routine Maintenance 2 based on comparison with the Routine Maintenance 1 - **fill in the blanks** of following figure




they are similar: activities should be carry out during a year



Using hand tools
(knife, hoe, showel,...)




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Skill:
.....
.....
.....



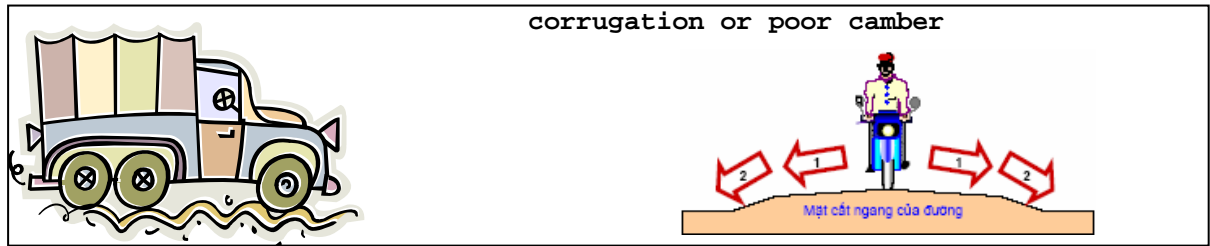
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Material:
.....
.....

 Read **"Rural Road Maintenance Handbook"** page 92 and 93 to know about routine maintenance

activity 20 - Reshape road camber by grader.
Fill the blanks to complete the procedure



corrugation or poor camber

Reshape camber using
.....
.....

Treatment procedure



Purpose of camber reshaping is
.....
.....
.....

Step 1:

Prepare refilling materials while pavement surface is corrugated seriously.



Refilling material

Step 2:

Local treatment & pavement scarification using
.....
.....
.....



Step 3:

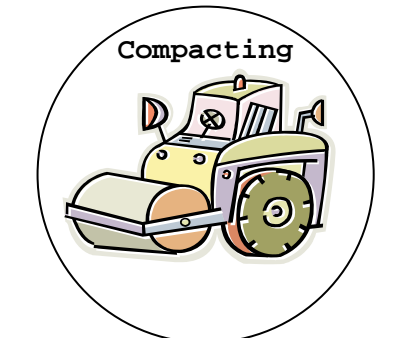
Cut & move pavement material from protruding to sunken place by
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.....



Grading

Step 4:

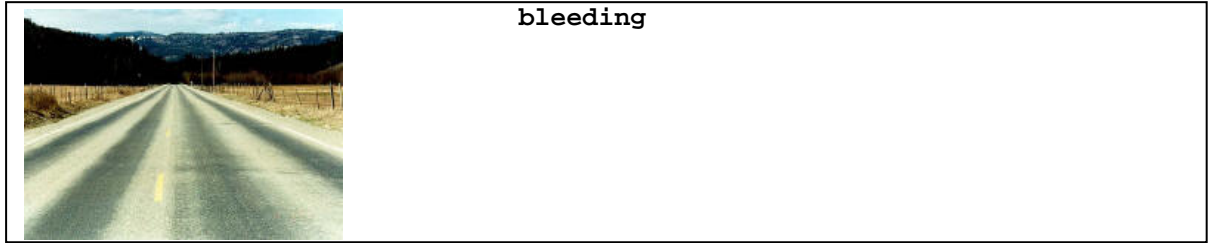
Compact pavement
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Compacting



Bleeding of bituminous pavement reduces skid resistance



Bleeding results in adhesion of tire and pavement in sunshine and slipperiness in rainy

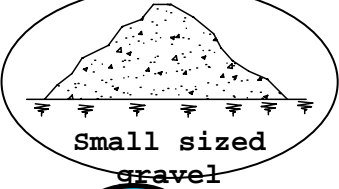
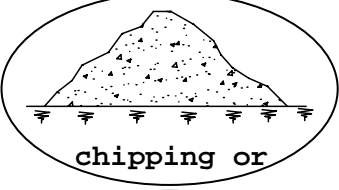
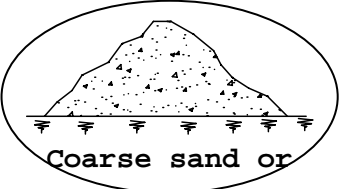
Purpose of anti-bleeding is ensuring traffic safety

Treatment Procedure



Step 1:
Prepare material to spread on bleeding area.
Usable materials:

- Coarse sand
- Chipping or
- 0.5 -1.0mm sized gravel

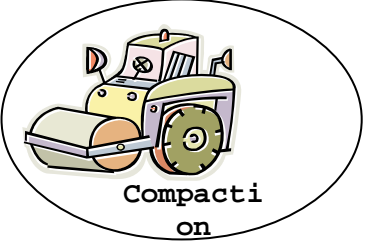


Step 2:
Spread (coarse sand, chipping of gravel) evenly on pavement at bleeding area.

Note:
It should be carried out at noon in hot weather to make adhesion between bitumen and aggregate



Step 3:
Compact using light roller to make aggregate fastened into bituminous pavement



Should:
Sweep chippings, coarse sand from shoulder up bleeding pavement





Fill in the blanks to complete pothole filling procedure (in large area) on bitumen sealing surface.



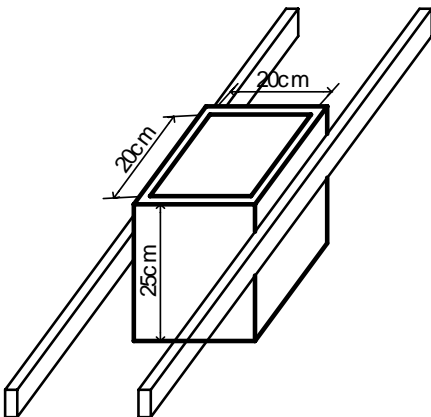
Tools ?

1. Mandrel
2. Crowbar
3. Hand-compactor or roller
4. Bitumen tank heater
5. Bitumen sprayer



Materials

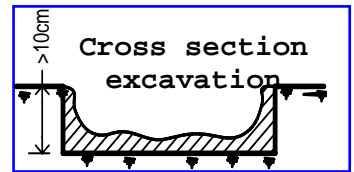
1. Bitumen
2. Crushed stone 4x6
3. Crushed stone 2x4
4. Crushed stone 1.6x2
5. Crushed stone



10 litres wooden bin

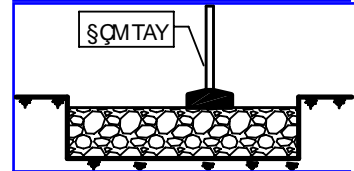
Step 1:

Localize & excavate pothole to minimum depth of 10 cm, clear excavated hole.



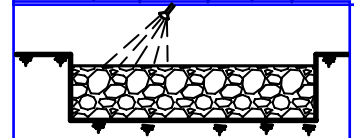
Step 2: Spread standard crushed stone

Spread crushed stone 4x6 or 2 x 4 by hand and compact by pedestrian



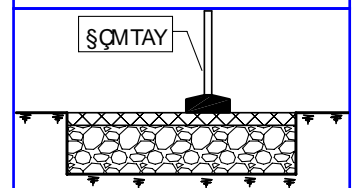
Step 3: The 1st bitumen spraying

Hot bitumen spraying in ratio of 1,9kg/m²



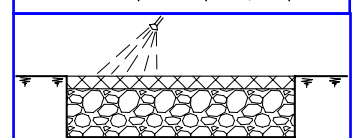
Step 4: The stone spreading

Spread crushed stone 1.6x2 by hand and compact by pedestrian compactor or roller. 18 - 20 litre/m²



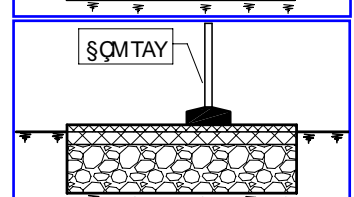
Step 5: The bitumen spraying

Spray hot bitumen in ratio of 1,5kg/m²

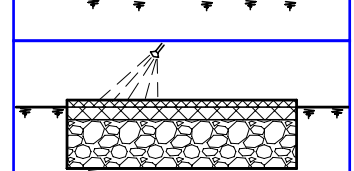


Step 6: The stone spreading

Spread crushed stone 1 x 1.6 by hand and compact by pedestrian compactor or roller. Crushed stone ratio is 14 - 16 litre/m²

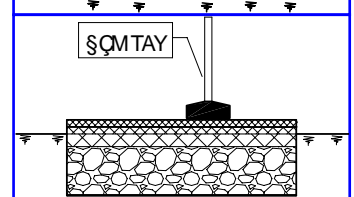


Step 7: The bitumen spraying . Spray hot bitumen in ratio of 1,1kg/m²



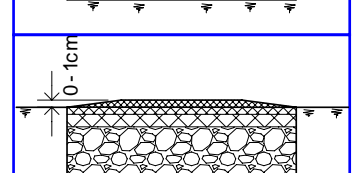
Step 8: The stone spreading

Spread crushed stone 0.5 x 1 by hand and compact by pedestrian compactor or roller. Crushed stone ratio is 9 - 11 lýt/m²




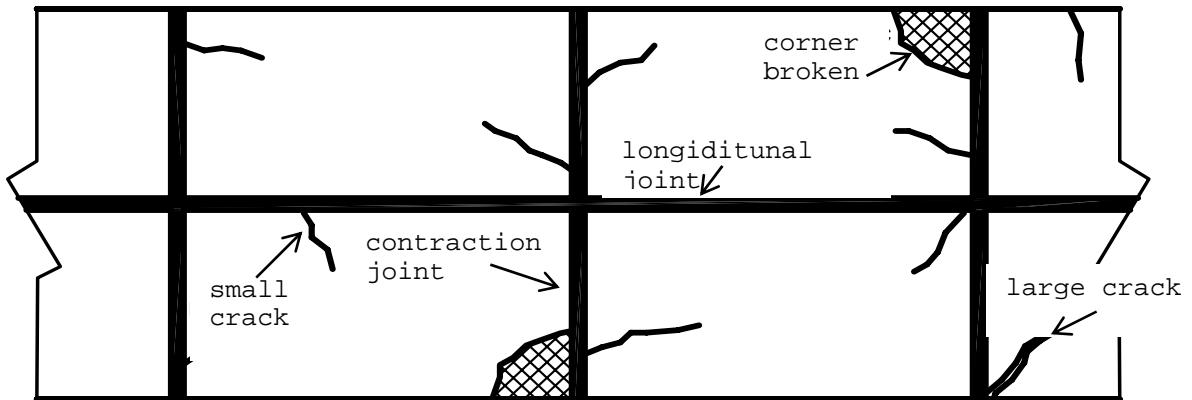
Step 9: Finishe pothole filling surface.

Finishing surface is even and higher 1 cm than existing pavement (for secondary compaction)





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 Concrete pavement is usually damaged as cracking and broken at slab edge and/or corner.





Small crack treatment: cracking width less than 5mm

Step 1:
 Use heated hard bitumen or

Step 2:
 Fill crack by coarse sand/ trowel


Small broken on concrete slab

Step 1:
 Clean broken area using brush/ blowing cleaner. Do not wash!

Step 2:


Large crack treatment: cracking width more than 5mm

Step 1:
 Clean broken area using brush/ blowing cleaner. Do not



Step 2:
 Fill crack by bitumen mastic

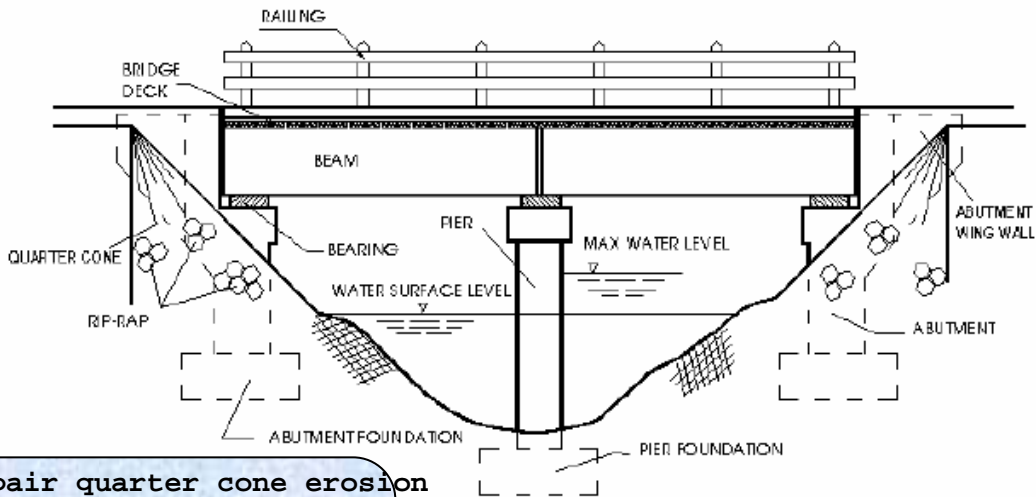


Step 3:

Fill broken area by bitumen mastic

Serious cracking & broken concrete slab should be removed and replaced by the new one. Corner with large crack (> 50

☞ Drainage structures such as bridges, culverts... usually are eroded due to swift-flowing river.



Repair quarter cone erosion

Step 1:

Clear erosion area: remove rocks & excavate all soft soil.



Step 2:

Refill using suitable soil and compact.

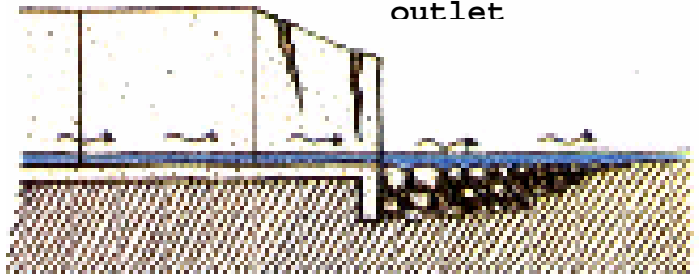


Step 3:

Rebuild quarter cone using masonry with 100# cement mortar



Repair eroded outlet



Step 1:

Work should be done in dry season. Prepare construction site, hold back the stream to repair culvert inlet

Step 2:


Excavate damaged inlet

Step 3:

Refill aggregate with high depth of excavation. Compact to required density

Step 4:

2. Make practice to realize wrong/right steps of maintenance activities procedure

 Strick through (~~kkkkkk~~) the wrong sentences in the following procedure to reshape road camber

1. Rural Road Maintenance - activity 20 to reshape road camber using grader should be carried out when road surface is corrugated or poor in cross fall.
2. It is not necessary to drain away water pond on road surface because it needs anyhow to water filling material for optimum moisture content to compact.
3. It could be necessary to scarify existing pavement to bottom of the damages and to turn up pavement material.
4. Light grader is operated to make passes from pavement centre to edges.
5. No need to have refilling materials. It is only necessary to cut pavement in the place and move to another.
6. It is only necessary to make pavement surface even. No need to recompact.
7. Completed cross fall is about 5%. It is checked every 100 metre using cross fall template.

Good

Not good



Fill the correct orders in the right column for pothole filling on bitumen sealing surface.

1.	Clear excavation material in pothole	<input type="checkbox"/>
2.	Layer 4 x 6 crushed stone at level that is included compaction ratio of 1.3	<input type="checkbox"/>
3.	Localize pothole, excavate in square shape to 10 cm depth.	<input type="checkbox"/>
4.	Layer 16x20 crushed stone in ratio is 18 - 20 litre/ m2,	<input type="checkbox"/>
5.	The first bitumen spraying in ratio of 1.9 kg/m2	<input type="checkbox"/>
6.	The second bitumen spraying in ratio of 1.5 kg/m2	<input type="checkbox"/>
7.	The third bitumen spraying in ratio of 1.1 kg/m2	<input type="checkbox"/>
8.	Spread 10 x 16 crushed stone in ratio of 14 - 16 litre/m2, then compact	<input type="checkbox"/>
9.	Spread 5 x 10 crushed stone in ratio of 9 - 11 litre/m2, then compact	<input type="checkbox"/>

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Ch-a §¹t