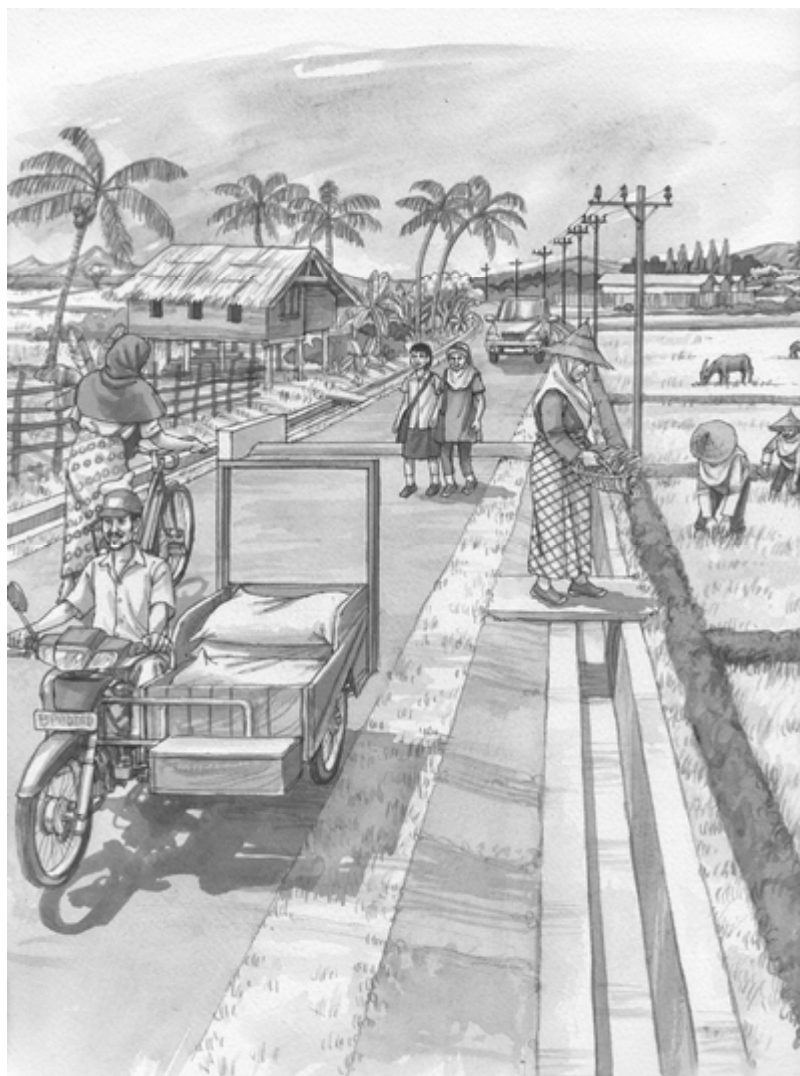


Handbook 3: Working to keep district road carriageways in good condition



A well maintained road

This handbook looks at techniques for carrying out routine maintenance works
on district road carriageways, both gravel and paved surfacing



Step by step guide to implementing routine maintenance

C1 Fill potholes and ruts and reshape carriageway-Gravel Roads



Where the road has potholes fill the holes
Where the road has ruts, fill the ruts and reshape the road using

Tools:
Shovel
Hoe
Hand-rammer
Wheelbarrow
Rake
Basket
Watering can

the existing gravel or good soil to give the surface a roof shape. Instructions for pothole filling are provided in Sheet C1 on page 3.



The carriageway examples provided above are for a gravel road or a Telford road with a gravel top layer. District roads also have paved surfaces. These roads can develop cracks, potholes and become deformed.

C2: Maintenance of paved road surface - cracks



¹

Reseal cracks: see advice provided in sheet C2 on page 4.

Tools:

Shovel
Wheelbarrow
Rake
Watering can
Brush

Materials:

Binder
Sand

C3: Road Base patching and Pothole patching

All holes should be made square or rectangular with a flat base surface.

Advice on repairing potholes in paved roads is provided in sheet C3 on pages 5 and 6



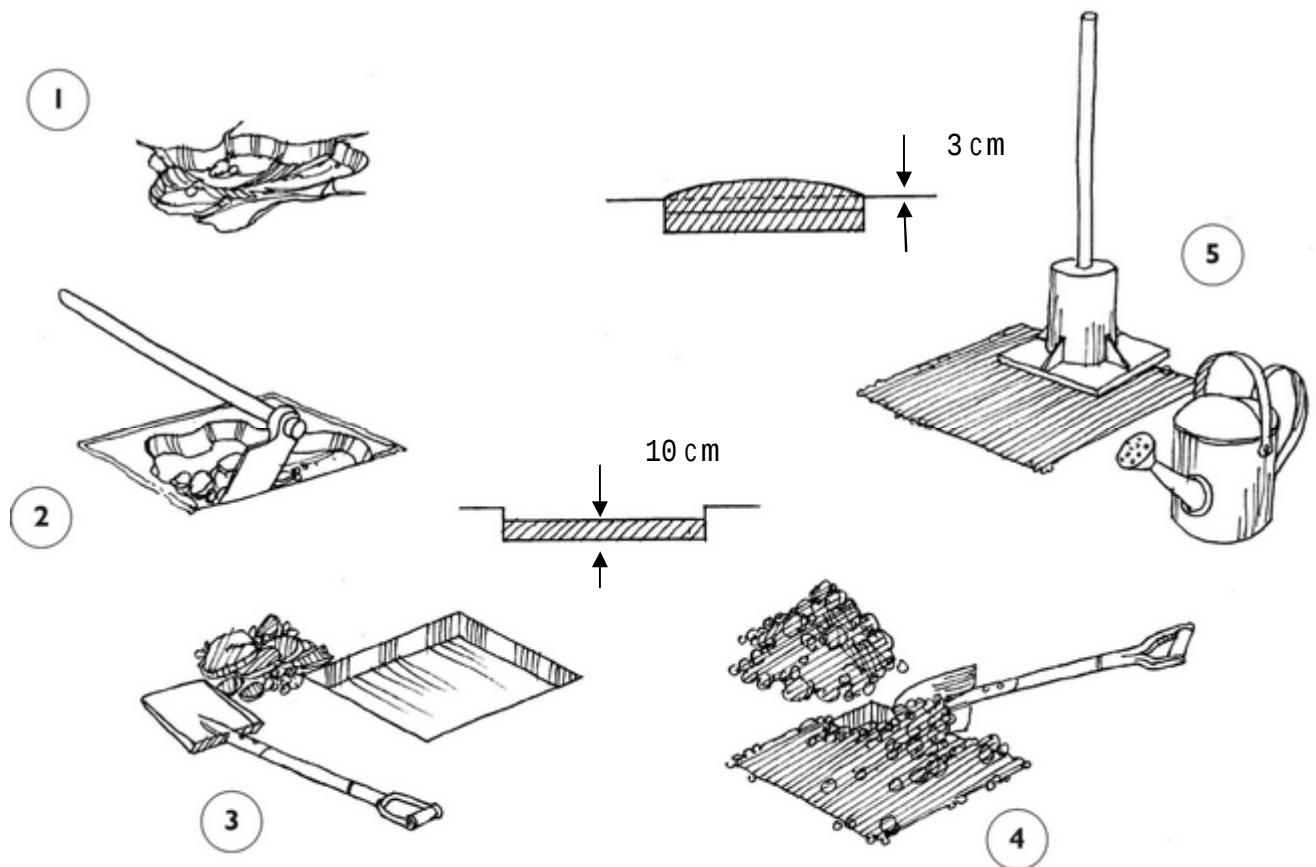
Tools:

Shovel
Pick axe
Wheelbarrow
Hard broom
Hand rammer/
vibrating plate
Watering can
rakes

¹ Illustrations and content for pages 2 to 7, adapted from the International Road Maintenance Handbook Volume III, Paved Roads, PIARC

Repairing potholes in gravel roads

Sheet C1



Steps

1. Remove all wet soil and loose stones and soil from the pothole
2. Dig out the pothole to make a square shape (This helps the filled material stay in place and it will not be pushed out again by the next truck that goes along the road)
3. Also make sure the base of the pothole is flat.
4. Fill the pothole in layers with good moist soil. The soil should be moist not wet, and the layers should be a maximum of 10 cm thick.
5. Each layer should be compacted using a hand rammer, with additional water only if needed. The final fill should be about 3 cm above the level of the surrounding road

TREATMENT OF ISOLATED CRACKS

In these cases the cracks can be filled either with bitumen emulsion or a hot cut back bitumen.

1. Sweeping the area (a)

The crack to be filled must be **clean** following this operation.

2. If Heating the binder

Do not overheat the cut back bitumen as this will affect its durability. Use a bitumen thermometer to check the temperature during heating. Bitumen emulsion does not need heated.

3. Distribution of the binder

This is carried out using a spray lance or watering can to follow the line of the crack. The nozzle of the spray lance or the spout of the watering can must be held close to the road surface. The width of spread should be kept as small as possible.

4. Distribution of the sand

Coarse sand is scattered over the strip of binder using a shovel.



LOCAL SEALING OF LOCALISED CRACKS

The treatment is applied in four stages:



1. Sweep the area

This is carried out by hand. The road surface **must be clean and dry** following this operation.

2. Mark out the area to be sealed

The surfacing that is to be covered is outlined in chalk or marking paint.

3. Distribution of the binder

The binder is distributed over the surface using a spray lance or a watering can at the following rate: 0.5 litre/m² for bitumen emulsion (cms-2h or E-71) and 1kg/m² for cut back bitumen. It is important not to

overheat the cut back bitumen or cationic emulsion as this will affect its durability. A thermometer should be used to check the temperature during heating. Smoking should not be allowed when handling cut back bitumen. Bitumen emulsion does not require heating.

4. Distribution of the aggregate

The aggregate is scattered by shovel from the truck or trailer. The material used is:

- coarse sand up to 5 mm, when dealing with cracks,
- chippings (such as 6-10 mm size) for local surfacing repairs.

The whole of the surface must be covered.

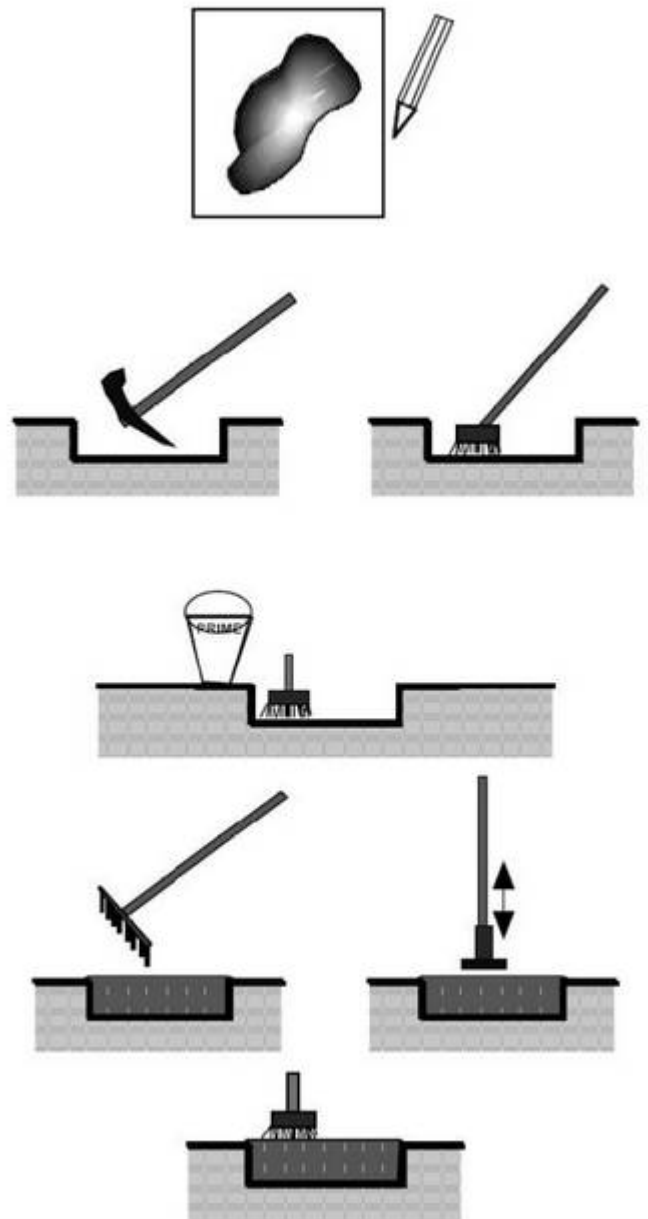
Repairing potholes in paved roads

Sheet C3

Work method

Mark the sides of the pothole in a rectangular shape. Check whether only the bitumen layer is affected or also the base or even the sub-base layers.

- Remove all loose material and excavate the pothole to at least 40mm depth or until hard firm ground is reached
- Where the base, or even the sub-base is affected, excavate loose material and refill with approved material. If necessary stabilise the material as instructed by the engineer. Compact with hand rammer or vibrating plate, in layers
- The bottom of the pothole must be hard and brushed clean with a broom
- Paint the bottom and the sides of the pothole with prime coat / emulsion (css-1h) with a block brush. Paint evenly not too much but that the prime coat covers the surface totally
- Place preferably coldmix, but hotmix can also be used in the pothole and rake out to 10mm above the existing road surface
- Compact with hand rammer and /or roller/ vibrator plate until a uniform level is reached. The surface of the asphalt must be even and with no holes.
- Paint the surface of the pothole with emulsion sealant (cms-2h) and sand if necessary.
- Keep traffic off the pothole until the surface is dry.



<i>Tools and equipment</i>	<i>Material</i>	<i>Safety signs and Devices</i>
• Pick axes and shovels • Metal rakes • Wheelbarrow • Hard brooms and block brushes • Small vibrator plate, roller or hand rammer • Watering can with rose head • 2m straight edge and measuring tape	• Marking paint / chalk • Primer coat (Css-1h) • <u>Coldmix</u> / hotmix • Sealant bitumen emulsion (cms-2h)	• “Works ahead” signs • “Road narrows” signs • “Slow down” signs • Stop/Go boards • Traffic cones • Red flags • Safety vests