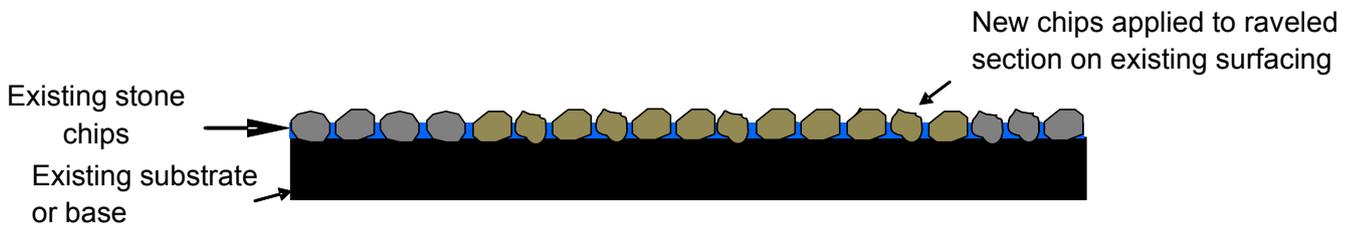


## Method statement for labour based construction of:

### Surfacing repairs – stone chips



#### Definition

This procedure describes the repairs to an existing surfacing seal whereby stone chippings lost by ravelling are replaced using an emulsion application with aggregates applied to it by hand.

#### Application

This repair procedure is undertaken to ensure that the underlying structural layers are protected from the wheel actions and protected against the ingress of water.

#### Material requirements

**Aggregates:** - Hard, single sized stone aggregate or sand that is clean and free of dust or clay particles or organic materials. The stone aggregates are limited to single sized 6.7 mm, 9.5 mm, 13.2 mm or 19.0 mm chippings.

**Bitumen emulsion:** - Cationic spray grade bitumen emulsion with 60 or 65 % binder is recommended. The latter is preferred due to the higher viscosity of the emulsion. The advantage however of using a 60% emulsion is that it can be sprayed at ambient temperature, whereas 65% emulsion should be heated to at least 50 to 60 degrees Celsius to reduce the viscosity. .

**Water:** - Potable water

#### Plant and equipment requirements

Item	Number of items
Pedestrian double drum vibratory roller with mass of 0.6 t or more	1
Wheelbarrows	2

Shovels	5
Block brush	1
Brooms	2

## Labour requirements

Below is the typical composition of a chip repair team. Production values are difficult to provide given the variability of the repairs that may be encountered. The team size can also be increased depending on the extent of the repairs being undertaken.

Activity	Number of workers
Loading of chips & transporting in wheel barrows	2
Tacking & Chip spreading	3
Roller operator	1
Sweeping	2
Traffic control	2 - 4

## Construction

### Site Preparation

The area to be repaired will need to be swept clean of all loose chips and dust before the operation can commence.

To prevent the operation from being slowed down due to on the delivery of stone aggregate, small stockpiles can be deposited along the road side as close to the repair areas as possible to reduce the distance required for the stone aggregate to be wheeled. Alternatively a bakkie can be loaded with the required aggregate and driven from repair to repair. The quantity required for a day's production can be determined based on the spread rate required for the particular application.

### Application of emulsion

The emulsion will need to be applied with a block brush. Calculate the area of the patch and determine the amount of emulsion required to get the correct application rate. Measure out the emulsion and spread it evenly over the area.

A rough guide for the application rate of the emulsion is given in the table below based on the aggregate size used. The client or his agent on site will need to provide the exact value required for the particular project.

<b>Stone aggregate size (mm)</b>	<b>Emulsion application rate (l/m<sup>2</sup>)</b>
Sand	1,0 - 1,2
6.7	1,0 – 1,2
9.5	1,2 – 1,4
13.2	1,4 – 1,6
19.5	1,6 - 1,8

The application of a second spray is not common practice as it will delay the opening of the section of road to traffic. Also, with the finer aggregates the relatively low application rate of the binder will not permit a split between the 1<sup>st</sup> spray and the fog spray. Should a second spray be called for on the larger aggregates sizes it can be applied using the block brush.

### **Stone application**

The application of the stone chippings must commence as soon as practically possible after the application of the emulsion to ensure the stone aggregate falls onto the unbroken emulsion. The chips will need to be applied with the shovels. The action to get the chips spread will need to be practiced before the actual operation commences. Every effort should be made to get the stone chips to fall vertically onto the emulsion layer in a single layer. This is normally achieved by tossing the stone aggregates up into the air using a semi-circular action of the shovel. Any excess stone will need to be swept off the surface before rolling commences. Corrections to the spread of stone chippings should be made using the back of the broom rather than the bristled side as this will tend to remove the emulsion.

### **Rolling operation**

Rolling of the stone chippings should commence as soon as possible to promote their bedding down into the emulsion. No severe turning with the roller should take place on the repair

surface itself until the stone aggregate is well bedded down and the emulsion broken. Any turning needs to be gradual on the oldest section repair sections or sound surface to prevent the stone chippings from being shifted out of position.

### **Traffic control**

Traffic must not be allowed onto the seal until such time as it is fully set, particularly on areas where turning actions as well as stop start actions occur. Under favourable weather conditions this may take approximately four to eight hours.

### **Quality control**

Three key aspects requiring careful control are:

- Emulsion application rate - incorrect binder spray application rate will result in either the stone chippings not adhering to the base or bleeding of the surface;
- Chippings to be dust free - dust on the chips will result in poor bonding of the aggregate to the binder, resulting in chip loss.
- Chipping at the correct spread rate - too lean an application may result in the emulsion being set by the time the back chipping occurs, leading to poor bonding and eventual ravelling. Applying too much aggregate results in added work for the sweepers, who must remove the excess stone from the surface. This could also result in a shortage of aggregate before the day's production is achieved.;