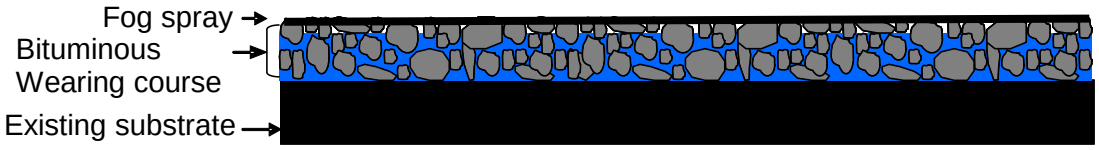
Method statement for labour based construction of:

Fog spray



Definition

A fog spray is a light application of diluted bitumen emulsion to a bituminous surfacing as a part of the construction of such a surfacing or as a maintenance measure.

Application

If applied during the construction of a new seal its purpose is generally to ensure that the stone chips in the single or upper layer are held in place. The net bitumen content of the fog spray is part of the overall design binder content required for the entire chip seal. This situation is also applicable to a reseal operation where a fog spray is required.

A fog spray can also be applied as a maintenance procedure on an existing bituminous surfacing to assist in retaining the aggregates in place, sealing the layer against water ingress or to "rejuvenate" the surfacing when it is showing signs of "dryness" resulting from ageing/hardening of the bitumen. This latter process is sometimes referred to as a surface enrichment. A fog spray is most effective when the layer still has sufficient skid resistance and the surface texture such that the fog spray can penetrate into the layer and not lie on the surface of the aggregates which may result in tyre pick-up of the binder residue and/or poor skid resistance.

Binders used for fog spray are generally either cationic or anionic emulsions. Cationic emulsions are more suited to dilution on site whereas anionic emulsions should be delivered already diluted for use from the manufacturer.

The application rate for a fog spray will be specified by the client or his agent, but will generally be 0.8 - 1.0 L/m^2 of 50/50 emulsion/water blend, with the net quantity of bitumen *normally* not less than 0.25 L/m^2.

Material requirements

Bitumen emulsion: - Anionic stable grade bitumen emulsion (60%) is the preferred option. Cationic stable grade and spray grade emulsion can also be successfully applied in many instances. The products can be obtained in 200 L drums or in bulk.

Water: - Potable water is required for dilution, however depending on location of the project and the quantity required, suppliers will deliver the product to the specified dilution. Generally the dilution is 50% emulsion and 50% water, resulting in 30% emulsion.

Plant and equipment requirements

Item	Number of items
Hand operated spray cart with 210 L emulsion drum holder	1
Or	
Spay tanker towed with tractor or bakkie	1
Hand brooms	4

Labour requirements

Below is the typical composition of a hand spray team required to spray 400 L/hr i.e. 2 drums of diluted emulsion per hour. The sweeping operation needs to be balanced with the correct amount of labourers to ensure the spray operation is not delayed by the sweeping team.

Activity	Number of workers
Loading, diluting of emulsion & spraying operation	2 or 3
Sweeping of surface (75 m^2/labourer/hr)	Min of 4 (depending on area to be prepared)

Traffic control (if required)	2

Construction

Site Preparation

Fog spray should only be applied during the day in good weather conditions. Care should be taken when spraying on a windy day as the spray may be carried some distance and damage property or passing vehicles down-wind of the operation.

Kerbing and channels, if present, will need to be covered and protected with black plastic, metal or thin timber sheets or other suitable material.

The surface on which the fog spray is to be applied must be swept free of dust and other unwanted material. Sweeping should be done in a down-wind direction so as not to have the dust resettle on the surface. *(See SABITA DVD200 for more detailed information on kerb protection and sweeping operations)*

In the construction of chip seals or in resealing operations, the fog application is to take place one day after the final layer of aggregate has been applied. Wetting of the surface with a fine mist spray will improve the penetration of the fog spray into the spaces between the stone chips. However, care should be taken to ensure that the surface is only damp and that no ponding is evident after the water has been applied.

Loading, diluting emulsion

The emulsion is generally diluted 50/50 with water. This can most easily be achieved by pumping across half of the emulsion from one full drum into an empty drum and refilling the drum with an equal quantity of water. Diluting anionic emulsion can be problematic on site. It is also important to note that water should be added to the emulsion, and not emulsion to the water.

Note
Make sure that the empty drum contained the same product currently in use i.e. anionic or cationic emulsion. Mixing of the two grades will cause instant setting or coagulation.

The emulsion can be sprayed at ambient temperature and need not be heated. Note that the emulsion will be less stable having been diluted.

Spraying the emulsion by using a hand lance:

Whether using a spray tanker (drawn by either a tractor or bakkie) a hand pulled spray cart with motor driven pump or a hand pulled spray cart with a manually operated pump, the preparation is essentially the same

The piping should be checked for leaks and the motor, where present, for correct operation, having no leaks, with pulley sufficiently tight and having sufficient oil and fuel.

Nozzles should be cleaned with diesel, if necessary, away from the road surface. Care should be taken not to cause spillages that will damage the environment. The trial spray can be done back into the drum to avoid pollution.

When using a hand pulled spray cart one or two additional team workers are required to pull the cart and assist with handling of the equipment on site. When using a spray cart with a manually operated pump a further additional person will be required to operate the pump action to spray the emulsion.

Calculate the area to be sprayed from the quantity of diluted emulsion in the drum. **Example:** 200 L of diluted emulsion (or 1 drum) will cover 200 m^2 at an application rate of 1.0 L/m^2. Therefore, if the road is 5 m wide, the drum will cover a total length of 40m. Spray application of around 1.0 L/m^2 is the accepted norm giving a residual binder application of approximately 0.3 L/m^2 for 60% emulsion diluted 50/50 with water. The appropriate area should be marked out to assist in obtaining the correct spray rate.

Spraying should be carried out in wide sweeping movements of the hand lance with 1/3 overlaps between successive applications. The actual spray rate should be continuously checked by comparison of the area covered and the area marked. It is preferable to have the same experienced spray operator undertake this operation each time as the correct application is a critically important factor for satisfactory performance of chip seals.

After the completion of the spraying operation, spray plant equipment should be cleaned with diesel and all waste products removed from the site. Remember that the environment must be protected at all times!

Traffic control

Traffic should not be allowed on the freshly applied fog spray.

Traffic accommodation, if required, will require that the entire lane or area under construction is closed to traffic. If needed, flagmen will be required to assist with stop-go traffic control depending on the area in which the work is being undertaken and the volume of traffic experienced. *(See SABITA TRIP Training manual for more details)*

Traffic accommodation needs to be well managed as it places the entire workman team at risk. Training in the correct operation of traffic accommodation at roadworks is vital for the safety of the workmen team as well as allowing safe, free flowing traffic through the construction site.

.Quality control

The diluted emulsion should be checked for stability before spraying.

Before loading the drum containing the diluted emulsion, it should be rolled around for about 1 minute to ensure that the contents are properly mixed

The emulsion and the surface on which it is to be sprayed should be checked for compatibility

Achieving the correct spray rate is critical. If the fog spray is over-applied bleeding with loss of skid resistance may result