MAIN ROADS
Western Australia

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TECHNOLOGY AND ENVIRONMENT DIRECTORATE

GUIDELINES FOR THE TIMING OF BITUMINOUS SURFACING TREATMENTS

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1. PURPOSE

To provide guidelines on the curing of various bituminous treatments and the times required before trafficking or application of a subsequent layer. The guidelines will be applied to supplement contract specifications and to assist project managers, contract superintendents and associated staff minimise risks and deliver quality works.

2. SCOPE

The guidelines apply to all bituminous surface treatments commonly used by Main Roads on new construction, resurfacing or rehabilitation works. They describe each surfacing type, its function, the bituminous binders used, the advantages and disadvantages of the treatments, the time required for the binder to cure, subsequent treatments and trafficking and the minimum and maximum times between initial treatments, subsequent treatments and trafficking.

3. REFERENCES

AS 1348-2002 Road and Traffic Engineering – Glossary of Terms.

Engineering Road Note 7 - Bitumen Scrap Rubber Seals.

Main Roads Standard 6706/04/154 - Guidelines for Surfacing Type Selection.

Main Roads WA Scrap Rubber Bitumen Guide.

The latter three referenced documents are available on the Pavements Engineering page on Main Roads' website. In addition to the references listed, other State Road Authorities were consulted and their specifications and manuals considered. Where appropriate this guideline was made consistent with national practice.

4. TYPES OF SURFACING

The terminology used in this guide is generally consistent with that used in AUSTROADS surfacing publications and AS 1348. Refer to the Main Roads *Guidelines for Surfacing Type Selection* for details of the types of surfacings used on the Main Roads network.

5. GUIDELINES

5.1 Treatment Types

For the purposes of these guidelines, bituminous surface treatment types may be considered in terms of initial and subsequent treatments. These may be categorised as follows:

Treatment		Common Types
Initial Treatments	Prime and seal	Prime - Binder 50/50 bitumen/cutter Seal - Binder class 170 bitumen, 10 or 14mm cover aggregate
	Primerseal	1. Binder 95/5 or 90/10 bitumen /cutter, 10 mm cover aggregate 2. Binder nominal 80/20 bitumen/cutter, sand cover aggregate
	SAMI	Binder 82/18 bitumen/scrap rubber, 10 mm cover aggregate
	Prime and waterproof bridge deck membrane	Bitumen emulsion prime, 80/20 Bitumen/scrap rubber binder with 5 mm aggregate
Subsequent Treatments	Seal	Binder class 170 bitumen, 14 mm cover aggregate
	SAM	PMB, 14 mm cover aggregate
	Reseal	Binder class 170 bitumen, 10 mm cover aggregate
	Asphalt	10 or 14mm dense graded asphalt

Table 1 Surface Treatment Types

The different treatment types have different curing requirements plus advantages and disadvantages according to traffic and other conditions. Selection of the optimum treatment type will minimise curing problems as well as provide the most cost effective treatment. This guide describes the curing requirements and subsequent limitations of the various initial treatments so that the most appropriate selection may be made. It provides a guide as to the curing time required between subsequent layers in initial treatments and between initial and final treatments.

5.2 Recommended Pavement/Ambient Temperatures at Application

The recommended pavement / ambient temperature at time of application of surfacing treatments are summarised in Table 2. It is assumed application will not proceed if rain is imminent.

Surfacing type	Pavement Temperature	Remarks
Prime	> 5°C	
Primerseal / Seal – Emulsion & Enrichment	15°C – 45°C	Up to 60°C is generally successful. A skin may form and delay breaking at > 60°C
Primerseal / Seal - Cutback	>20°C	Medium Curing Cutter required when < 40°C
SAM / SAMI / Bridge Deck waterproofing	> 25°C	
	Ambient Temperature	
Microsurfacing / Slurry	>10°C or >7°C rising	
Asphalt – DGA	>10°C	
Asphalt – SMA	>15°C	
Asphalt – OGA	>20°C	

Table 2 - Pavement and Ambient Temperature at Application

5.3 Initial Treatments on New Pavements

The aims of all initial bituminous treatments on new (or reconstructed) pavements are to provide a strong bond to the prepared surface and a continuous durable waterproof membrane that can carry traffic. This can be achieved through use of a two stage prime and seal process or a single stage primerseal process. In the two stage process, the function of a prime is to penetrate, bond to and bind the surface of the prepared pavement to provide a surface to which the subsequent seal can adhere. The seal is intended to provide a durable waterproof membrane able to carry traffic.

In the single stage process the primerseal binder is intended to penetrate and or bond to the prepared pavement surface as well as hold the cover aggregate. The primerseal is intended to perform the functions of both a prime and seal. Both approaches have advantages and disadvantages related to the processes and binders used.

The aims of applying an initial sprayed treatment (ie a SAMI) to a cracked pavement are to bond to the underlying bituminous surface, to waterproof and to prevent reflection cracking through a subsequent asphalt overlay.

The aims of applying an initial bridge deck treatments are similar to those of a SAMI, except the waterproof membrane must bond to a concrete deck. It is usual to use a two stage process.

5.3.1 Prime and Seal

5.3.1.1 Prime

A prime must have a suitable viscosity so that it is capable of penetrating into a prepared surface of a basecourse and seal pores in the surface. It must bond well to the surface and be readily absorbed so that it hardens and cures quickly. For these reasons the most common primes are heavily cutback bitumens, containing between 40 and 60 % medium curing cutting oil and 0.5% of adhesion agent according to the type and condition of the basecourse surface.

If properly selected and applied at the correct application rate a prime will leave a thin skin of residual binder on the basecourse surface. Time must be allowed for the hardening and curing of a prime before a seal is applied. Primes are not intended to carry significant traffic, although they are able to be lightly trafficked (not more than 100 vehicles /lane/day) for a short period (not more than 1 week) after curing and hardening has taken place.

The curing time required before a seal is applied to a cutback prime depends on the blend used for the prime, its rate of application, the prevailing climatic conditions and the porosity of the primed surface. The higher the application rate and the percentage of cutter used the longer the curing period. Typically between 3 days and one week is the required curing period.

Primes that are absorbed immediately into the basecourse surface and cure and harden very quickly may contain too much cutter or have been applied at too low an application rate. These factors should be adjusted or the base is likely to absorb binder from the subsequent seal and result in a reduced service life. Primes that are not absorbed or pool on the surface and require blinding may contain too little cutter or have been applied at too high a rate. These factors should be adjusted accordingly.

Some basecourse materials can be finished to provide a clean tightly bonded stone mosaic surface that enables a prime to be omitted as more viscous binders can adhere directly to the exposed stone. In these circumstances bitumen emulsion may be used as a primerseal or a seal may be applied directly to the basecourse surface. Similarly, a new well finished bitumen stabilised base may facilitate direct adhesion of a seal to the pavement and allow omission of a prime or use of an emulsion prime.

5.3.1.2 Seal

An initial seal applied to a prime is intended to provide a long lasting surfacing except where it is used as a waterproof layer prior to application of asphalt.

Seal binder must have a relatively high viscosity to hold the cover aggregate in place against the action of traffic. The most common binder used is class 170 bitumen, although this may be modified with scrap rubber or synthetic polymers for heavy duty use. The application of a seal to a properly primed surface normally ensures a good bond and a continuous waterproof layer. Except where applied in or 48 hours prior to adverse weather conditions, hot bitumen seal binders normally do not contain a significant proportion of cutting oil and can be overlaid with a second coat or asphalt almost immediately.

Hot bitumen initial seals applied to a prime can be trafficked immediately after completion but should not be expected to have as long a service life as a reseal or a seal applied to a primerseal. Resurfacing will usually be required within 2 to 10 years depending on aggregate size, traffic, climate and pavement conditions.

Bitumen emulsion may also be used as a seal binder. Standard emulsions contain approximately 60% bitumen (eg CRS/170-60 grade) and cannot be applied at more than about 1.3 L/m² without the risk of the emulsion running off the surface. This limits the use of emulsions to small cover aggregate sizes or necessitates the application of two coat seals (double/double seal). The standard Main Roads two coat emulsion primerseal falls into this category when described using national terminology.

It is important that the first coat has broken, set and cured before the second coat of an emulsion seal is applied. This may take from 1 to 8 hours depending on environmental conditions. It is also important that the second coat is not subject to uncontrolled traffic until the emulsion has broken and set so that the seal is stable and able to retain stone under unrestricted traffic. This may take a similar time, ie from 1 to 8 hours.

High bitumen content emulsion containing approximately 67% bitumen (eg CRS/170-67 grade) may also be used as a seal binder. These emulsions can be applied at much higher application rates than the lower bitumen content grades with a lesser risk of run-off (up to 3 L/m²) and require significantly less time to cure. They are applied hot (75-85 °C) and have less water to evaporate so they break and set more quickly and can be trafficked sooner under comparable weather conditions.

5.3.2 Primerseal

5.3.2.1 Cutback Primerseals

Primerseals may be constructed using graded or single sized aggregate. In both cases the primerseal binder must be fluid enough to penetrate and/or bond to the pavement surface as well as hold the cover aggregate in place against the action of traffic. The most commonly used primerseal binders are cutback bitumens. In national terminology cutback primerseal binders as those containing between about 10 and 20 % cutter plus adhesion agent, adjusted according to factors such as the type of cover aggregate, traffic and the type and condition of the base. These primerseal binders are more fluid than seal binders, and are hence usually restricted to use with small aggregate sizes (10 mm or less). Main Roads contract specifications may typically specify primerseal binders with 5% cutter to be covered with 10 mm aggregate. These would be considered seals using national terminology but will remain to be refereed to as primerseals within Western Australia.

Primerseals may be trafficked soon after completion (usually within half an hour) but they must be allowed to cure for a prolonged period before sealing to reduce the risk of cutters affecting the following surfacing. The period of curing required varies according to the percentage of cutter involved, but is generally a minimum of 3 months in hot dry conditions and up to a year in cooler conditions.

Graded aggregate (eg river sand) primerseals usually have a service life of between 1 and 2 years. One sized aggregate primerseals usually have a service life of between 2 and 5 years depending on aggregate size, traffic and climate.

5.3.2.2 Emulsion Primerseals

As an alternative to cutback bitumen, standard or specially formulated grades of bitumen emulsion may be suitable for primersealing. Their suitability will depend on the type and condition of the base and weather. Standard bitumen emulsions will not penetrate normal dense base course materials and must adhere directly these materials to establish a bond. This is difficult to achieve unless the base has been bitumen stabilised or has been finished to provide a stone mosaic surface or is open and porous. Specially formulated emulsions usually contain cutter and may be able to bond more readily to a basecourse surface. This treatment usually has a service life of 1 to 3 years before resealing is required.

Emulsion primes still require curing before trafficking to allow time for the emulsion to break and set, that is for the bitumen to come out of suspension, to adhere to the pavement and for all water to evaporate and the binder to harden. This may take a few hours or a day depending on the emulsion used and curing conditions. The standard two coat emulsion primerseal specified in many Main Roads contracts is more appropriately termed a double/double seal using Austroads terminology.

5.3.3 Advantages and Disadvantages of Prime/Seal or Primerseal Treatments

The viscosity and curing properties of the binders used for prime and seal and primersealing result in each process having advantages and disadvantages.

A prime and hot bitumen seal is best suited to use in the normal sealing season, and apart from the short curing period required for the prime can be opened to traffic immediately. A prime and emulsion seal can be applied outside the normal sealing season but is limited in the aggregate size that can be used without run-off unless a high bitumen content emulsion is specified, and does require a short period of curing for the emulsion before trafficking.

A cutback primerseal can be applied outside the normal sealing season but because the binder viscosity is relatively low is limited in the size of aggregate that can be used and has a shorter service life than a prime and seal. A minimum curing period of from 3 to 12 months is required before resurfacing can be applied because of the amount of cutter in the primerseal binder.

All treatments are susceptible to damage if it rains early in their lives due to the action of traffic and water and this should be considered when scheduling works.

A summary of the advantages and disadvantages of the various initial treatments is given in Table 3. Selection of the optimum treatment for expected conditions can minimise curing problems and provide the most cost effective treatment.

Treatment Type	Advantages	Disadvantages
Prime and seal	Able to be trafficked immediately on completion unless emulsion seal used	Application limited to normal sealing season unless emulsion seal used
	Prime gives strong bond to the pavement and reduces the absorption of seal coat binder	Prime must be cured before sealing
	Thick waterproof layer	Use of pavement by traffic prior to completion is restricted
	Prime may be used to protect the pavement prior to sealing	Emulsion seals require time to break and set prior to trafficking
	Generally more economic in overall costs, long service life	Two stage process with hot bitumen seal, may be three stage with emulsion seal
Primerseal	One stage process able to be applied outside the normal sealing season	Short service life, must be followed by a final seal usually within 1 to 2 years
	Can be opened to traffic immediately it is completed or soon after for emulsion primerseals	Cutback bitumen requires 3 to 12 months curing before resurfacing
	Allows repair of pavement deficiencies prior to final seal	May be susceptible to damage if rain falls soon after construction

Table 3 Advantages and Disadvantages of Initial Sprayed Treatments

5.4 Treatments on Cracked Pavements

The rehabilitation of cracked pavements must include measures to prevent cracks from reflecting through subsequent surfacings or layers. In unbound granular pavements cracking is usually limited to old or fatigued asphalt surfacings, although plastic basecourse materials may also crack due to shrinkage and result in cracks in overlying surfacings.

Treatments to prevent reflection cracking may include reworking of the pavement to eliminate cracks or application of a SAM or SAMI to an existing bituminous surface. A SAMI is an initial treatment that is limited to existing surfacings that are to receive an asphalt overlay. A SAMI may be applied directly or after cold planing is carried out to remove cracked asphalt. A SAMI is not intended to be trafficked for more than a short period as it is to be overlaid with asphalt. A SAM is a final treatment intended to be trafficked for some years.

The binder used in a SAMI is a modified binder which may be a scrap rubber binder or a polymer modified binder (PMB). The use of scrap rubber seals is detailed in TDP Specification 503 whilst the use of sprayed PMBs is detailed in Specification 509. Further guidance on scrap rubber sealing is available in Engineering Road Note 7 or the Scrap Rubber Bitumen Guide.

Scrap rubber binders contain a proportion of medium curing cutter in the range 5 to 10 % according to the pavement temperature at the time of application. This

necessitates a period of curing before overlaying with asphalt. The higher the % of cutter and the cooler the conditions, the longer the period of curing required.

The minimum curing time for scrap rubber SAMI's before overlaying with asphalt is normally specified as 24 hours. This minimum curing times is only applicable to the lowest % of cutter and hot conditions. There is an increased risk of bleeding and softening of the asphalt overlay if the minimum time is applied to SAMI's containing a higher percentage of cutter cured in adverse weather conditions. The application of SAMI's is usually limited to the warmer parts of the year and pavement temperatures above 25 °C. In these circumstances an extended curing period of 2 weeks minimum should minimise the risks with SAMI's containing a higher percentage of cutter.

A scrap rubber SAM may be trafficked immediately open completion, ie after incorporation and rolling of the cover aggregate into the binder.

PMBs are usually proprietary products that contain little or no cutter. Manufacturer's recommendations should be followed, however most PMBs used in SAMI's can be overlaid with asphalt about 2 hours after completion. Similarly PMBs used as SAM's can usually be trafficked immediately after completion of the SAM.

5.5 Initial Treatments on Concrete Bridge Decks

It is normal practice to apply a waterproof membrane to concrete bridge decks prior to asphalt overlaying. This membrane is usually a sprayed scrap rubber binder or a double/double seal in rural environs.

The Main Roads standard sprayed treatment is to apply emulsion to prime the deck, allow this to cure and then apply a 79/20/1 bitumen/scrap rubber/adhesion agent blend at 1.5 L/m². A single sized 5mm aggregate is then quickly spread and rolled into the binder to create a mastic type membrane. The scrap rubber binder is cutback with between 5 and 10% medium curing cutter according to pavement temperature. The treatment is not intended to carry any traffic and does take some time to cure. This period varies according to conditions but a minimum of 2 weeks is normally recommended and can be programmed to avoid delaying subsequent treatments. This requirement varies from that for a SAMI as the waterproof membrane treatment relies more on binder stiffness than the former because it uses a high binder application rate and small aggregate size.

Where it is not practical to use a scrap rubber binder and asphalt treatment in a remote site an alternative final treatment is a double/double seal using bitumen and 14/7mm aggregate.

5.6 Final Bituminous Surface Treatments

With the exception of seals, the initial treatments described often have relatively short service lives or are not intended to be trafficked at all. They are usually resurfaced with a long lasting bituminous surface treatment that has a life of the order of 10 to 20 years. Final treatments include seals or reseals, SAM's and asphalt.

These treatments are durable surfacings that usually benefit from being trafficked immediately after completion. Where bitumen emulsion is used as a seal binder then traffic must be kept off or strictly controlled until the emulsion has broken and set.

Asphalt treatments usually include a preparatory tack coat that should not be trafficked. Main Roads specifies a dilute (50/50 water/emulsion) CRS/50-60 bitumen emulsion tack coat applied at a rate of 0.6 L/m². Time should be allowed for the emulsion to break and the water to substantially evaporate before commencing asphalt paving. This may take from 1 to 3 hours depending on climatic conditions.

The timing of final treatments should be related to the properties of the previous treatment, the planned construction schedule and opening of the road to traffic (refer to 5.8). Final treatments should not be placed until other works such a shoulder construction, assembly of barriers etc, that could result in damage to the final surfacing have been completed. The final surfacing is not intended to be used as a construction platform.

Although it is usually preferable to leave application of final surfacing treatments until shortly before planned to traffic to minimise damage and avoid steric binder hardening, it may be acceptable to complete surfacing some time earlier in some circumstances. For example it is usually preferable to carry out bituminous works in good weather conditions some time prior to trafficking rather than executing these treatments in adverse weather conditions. It may also be necessary to complete the final treatment early to protect the pavement. Provided the potential problems with this approach are recognised and allowed for then this practice is acceptable.

5.7 Guide to Minimum Curing / Traffic Times

The minimum acceptable times between subsequent treatments and until trafficking are summarised in Table 4 for both the initial and final treatments most commonly used by Main Roads. They assume the most appropriate treatment has been selected for the traffic and other conditions and that the treatment has been correctly designed and applied. The minimum times given assume relatively good climatic conditions at the time of application and are not the ideal times needed to minimise risk for adverse conditions or unplanned events.

Initial Treatment	Traffic Allowed on Initial Treatment	Minimum Time Delay Before Traffic	Minimum Time Before Subsequent Treatment	Subsequent Treatment	Minimum Time Before Trafficking Subsequent Treatment
Cutback prime	Yes (1) limited	2 days	1-7 days	Seal hot bitumen	No delay (2)
Cutback prime	Yes (1) limited	3 days	3 days	2 coat emulsion seal or hot seal	1-4 hours 2 hours (3)
2 coat emulsion primerseal or seal - 1st coat	No	NA (4)	2 hours (3)	2nd coat of 2 coat treatment	2 hours (3)
Cutback Primerseal	Yes	No delay (2)	3 months	Seal hot bitumen	No delay (2)
SAMI Scrap rubber binder	Yes	No delay (2)	24 hours (5)	Asphalt	No delay (2)
SAMI - PMB	Yes	No delay (2)	2 hours	Asphalt	No delay (2)
Emulsion prime	No	NA (4)	2 hours	Waterproof bridge deck membrane	NA (4)
Waterproof bridge deck membrane	No	NA (4)	2 weeks (6)	Asphalt	No delay (2)
Seal / reseal hot bitumen	Yes	No delay (2)	NA (4)	NA (4)	NA (4)
SAM	Yes	No delay (2)	NA (4)	NA (4)	NA (4)
Tack coat	No	NA (4)	1 hour	Asphalt	No delay (2)
Asphalt OGA	Yes	No delay (2)	NA (4)	NA (4)	NA (4)
Asphalt DGA	Yes	No delay (2)	NA (4)	NA (4)	NA (4)
Asphalt SMA	Yes <40°C	No delay (2)	NA (4)	NA (4)	NA (4)

Table 4 Minimum Curing and Traffic Times for Common Main Roads Surface Treatments (7)

Notes

(1) Primes should not be trafficked until cured and then only with light traffic for a few days.

(2) No delay means after treatment is completed including rolling etc

(3) Sufficient time should be allowed for emulsion to break and set and for the seal to become stable before allowing traffic access. The time required will vary according to climatic conditions but should not be less than 2 hours.

(4) NA = not applicable

(5) Scrap ruber SAMI's usually contain 5 to 10 % cutter. Only SAMI's with a low % of cutter should be overlaid with asphalt after 24 hours. Where possible as much time as possible should be allowed for curing.

(6) Waterproof bridge deck membranes (scrap rubber modified binder) usually contain 5 to 10% cutter. Where possible as much time as possible should be allowed for curing

(7) The minimum times given are for good conditions. More time is likely to be required in adverse conditions.

5.8 Minimising Risk

The minimum times given in Table 4 provide a balance between the practical time constraints of construction and the risk of premature action for works carried out in relatively good conditions. Engineering judgement should be used when applying them. They should not be regarded as ideal for adverse conditions, particularly where the binder includes medium curing cutter and the treatment is to be overlaid with another surfacing. Cutter takes some time to evaporate or cure and until the process is complete the bituminous binder is softer and more susceptible to bleeding, or softening subsequent treatments resulting in shoving or other damage. Where practicable additional times to those given in Table 4 should be allowed to minimise risk. This risk is usually highest in adverse weather conditions or when the treatment is subject to heavy traffic.

All sprayed treatments are susceptible to damage early in their lives in inclement weather conditions, particularly if trafficked. As indicated earlier, some treatments are more suited to good weather conditions and some more able to cope with adverse conditions. Correct selection of the appropriate treatment is important to avoid unnecessary problems. This will not avoid all risk as weather conditions are not always predictable and are particularly unstable at certain times of the year. If works are likely to run into the colder or wetter part of the year, consideration should be given to including alternative treatments in contract schedules and to including provision for remedial and preventative measures.

Steps that can be taken to minimise risks with sprayed treatments in adverse conditions include the following:

- If a prime and hot bitumen seal is proposed but the works may run late in the sealing season, include a schedule item for the use and payment of a primerseal as a substitute, or the use of emulsion binder (eg a 2 coat emulsion primerseal or seal).

- If a primerseal is proposed include provision for:

  (a) traffic control and inspection and maintenance of the surface by personnel continuously for 24 hours

  (b) the pavement to be treated in half widths and traffic to be controlled for 24 hours before sealing the other half

  (c) the use of dry precoated aggregate kept dry in covered stockpiles

  (d) gritting of the primerseal to help lock aggregate in place

- If a hot bitumen seal must be attempted in adverse conditions, include provision for the use of hot, bitumen precoated aggregate

- Where sealing or primersealing is carried out in cold or damp conditions controlled trafficking may be used to compact the treatment and interlock the cover aggregate. This should involve keeping speeds down to about 20 km/hour and moving traffic around over the full width of the surfacing. Traffic control should be maintained until the surfacing is stable and able to withstand uncontrolled movement. Where trafficking is delayed, care must be taken not

to open the road to traffic in cold or wet conditions, as the aggregate is likely to strip.

Where the weather is unstable and intermittent showers are expected, risks are high but may be able to be managed by the measures suggested above. Where rain is expected over a long period, the risks associated with sprayed work are very high and the works should be delayed until a more appropriate time of the year.

5.9 Maximum Times Between Treatments

Most bituminous surface treatments are not particularly sensitive to delays between initial and subsequent treatments or delays in trafficking, however there are exceptions and advantages in limiting delays.

The exceptions include undue delays between priming and sealing/primersealing. Primes are not capable of resisting weather for more than a short period and cannot offer protection against other than very light, controlled traffic. Failure to apply the next treatment for a prolonged period can put the whole pavement at risk. Similarly, the first coat of many two coat emulsion treatments cannot carry traffic because of low binder application rates, and full protection of the pavement is not achieved until both coats have been completed. Primes on bridge decks prior to application of a waterproof membrane and tack coats prior to asphalt paving are also incapable of carrying traffic and susceptible to damage by other construction activities and heavy rain. Undue delays between these treatments and subsequent treatments should be avoided.

Many treatments benefit from traffic compaction, particularly primerseals, seals and SAMI's. Traffic realigns aggregate onto its least dimension, packs the stone closely together and initiates embedment so that a strong interlocked aggregate mosaic results. Traffic compaction is best carried out early in the life of a sprayed treatment, before the binder has oxidised or steric hardening has taken place. For this reason long delays before exposure to traffic are best avoided to maximise the benefits of trafficking. It is important that initial trafficking is controlled (ie low speed) so that these benefits are realised without undue stone loss or damage to the surfacing.

Traffic can also be expected to compact asphalt, tighten the surface and minimise the risk of ravelling. Again this is best achieved by trafficking with minimum delay so that oxidation and steric hardening do not impede the process.

Although there are advantages in minimising delays between final surfacings and trafficking, it is usually preferable to carry out bituminous works in good weather rather than in adverse conditions. If application in good weather causes delays that cannot be avoided by careful scheduling of works, then steps may be able to be taken to minimise the effect of delayed trafficking. These steps include adding flux oil to primerseal and seal binder, extended construction rolling, extended back rolling, use of rubber tyred rollers on asphalt to tighten the surface and protection of open graded asphalt from infiltration by fines, sand etc. Where surfacing works are brought forward to take advantage of good weather and this results in delayed trafficking, it is desirable not to initiate this delayed trafficking in cold or wet periods of the year as this increases the risk of failure.

An indication of preferred maximum times is given in Table 5.

Initial Treatment	Preferred Maximum Time Before Traffic (1)	Preferred Maximum Time Before Subsequent Treatment	Subsequent Treatment	Preferred Maximum Time Before Trafficking Subsequent Treatment (1)
Cutback prime	Does not require trafficking	2 weeks	Seal hot bitumen or 2 coat emulsion primerseal or seal	1 month
2 coat emulsion primerseal or seal - 1st coat	Not intended to be trafficked	1 day	2nd coat of 2 coat treatment	1 month
Cutback Primerseal	2 months	1 to 5 years depending on type of primerseal	Seal hot bitumen	1 month
SAMI Scrap rubber or synthetic PMB	Does not require trafficking (2)	1 week	Asphalt	1 month
Emulsion prime	Not to be trafficked	1 day	Waterproof bridge deck membrane	Not to be trafficked
Waterproof bridge deck membrane	Not to be trafficked	1 month	Asphalt	1 month
Seal / reseal hot bitumen	1 month	NA (3)	NA (3)	NA (3)
SAM	1 month	NA (3)	NA (3)	NA (3)
Tack coat	Not to be trafficked	1 day	Asphalt	1 month
Asphalt	1 month	NA (3)	NA (3)	NA (3)

Table 5 Preferred Maximum Times Between Treatments and Trafficking

Notes

(1) Preferred times are approximate only and are usually directed, maximising the advantages of traffic compaction while the treatment binder is still relatively soft and has not had time to oxidise.

(2) SAMI treatments do benefit from early traffic compaction but it is not essential

(3) NA = not applicable