LEICESTERSHIRE COUNTY COUNCIL
HIGHWAYS FORUM FOR NORTH WEST LEICESTERSHIRE

10TH JULY 2014

SURFACE DRESSING

REPORT OF THE DIRECTOR OF ENVIRONMENT AND TRANSPORT

Purpose of Report

1. To provide Members with an understanding of the process of surface dressing, its objectives and benefits.

The Aim

2. Surface dressing is fundamentally a straightforward treatment whereby a layer of new bitumen binder, overlaid with stone chippings, is applied to the surface of a carriageway and sometimes a footway. It is principally used as a maintenance technique to extend the life of a carriageway surface and to benefit road safety by improving or restoring the texture and skid resistance of the surface.

3. Surface dressing is widely recognised as an essential and cost-effective technique for maintaining the condition of the majority of bitumen-bound (often referred to as “tarmac”) roads. It is not an alternative to carriageway resurfacing, although the general public often perceive it as this.

4. It is helpful in appreciating the purpose of surface dressing to consider managing the lifecycle of a carriageway asset in terms of “maintenance”, “repair” and “renewal”.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Place in the Lifecycle</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Surface dressing</td>
<td>The primary “maintenance” process</td>
<td>Low cost. Used to minimise the need for “repairs” and to extend the lifespan of the surface and avoid frequent and costly “renewal”</td>
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<tr>
<td>Filling potholes and surface patching</td>
<td>Ongoing “repairs” to maintain serviceability</td>
<td>High cost and these treatments introduce their own inherent weakness.</td>
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<tr>
<td>Full resurfacing</td>
<td>“Renewal” of the asset</td>
<td>A relatively expensive process that is usually applied once a surface is in a condition that is beyond economic repair.</td>
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5. With this in mind, a good parallel can be drawn between the maintenance of highways and the maintenance of the exterior woodwork on a domestic property. Replacement of window frames represents the “renewal” stage, cutting out rotten wood represents “repair” while regular painting represents “maintenance” and in this context, is akin to surface dressing.
The Programme

6. The County Council undertakes an annual programme of surface dressing. Roads that are due to be dressed are currently identified between two to three years in advance of dressing. This is based on an analysis of the historical programme, the current condition of the road, accident data and factors that dictate the likely rate and type of further deterioration, such as the current construction and materials, traffic flows and new developments.

7. The programme is continuously refined, subject to changes in the above factors and in order to co-ordinate with other works, particularly major works by developers and utility companies.

8. Preparatory works usually commence around 18 months in advance of the dressing application, including patching any significant damage, installing any new features such as kerbs and recording details of white lines and characteristics of the site and existing surface that are required for the design of the dressing.

9. The surface dressing itself is undertaken each year during spring and late summer, when road surface temperatures are most suitable. To minimise the time and cost of moving plant and machinery, the operation usually progresses continuously around the county from one location to the next, although variations in materials usually results in at least two “circuits” being required.

The Design Process

10. The design of surface dressing is critical to its success and is based on sound engineering principles. The County Council follows the design principles set out in “Road Note 39” published by the Transport Research Laboratory which represents the industry standard. Staff involved have attended training provided by the Road Surface Treatment Association (RSTA).

11. Ahead of the process of dressing, the characteristics of each site are measured and observed, including the site dimensions, areas of shade and gradient (which require variations in binder application and/or chipping size) and the hardness of the surface is measured. Calculations are undertaken to establish the type and quantities of bitumen binder and chippings.

12. Line markings are also recorded. The existing markings are reviewed and the Traffic and Safety Group is asked to advise of any alterations that are required when the lines are replaced.

The Laying Process

13. Immediately prior to the application, the site is given a final check and items such as manhole covers and reflective studs are taped over so that they are not coated by the dressing. The carriageway is swept because the presence of dust and detritus reduces the adhesion of the new bitumen binder.

14. The whole operation then arrives on site. A number of vehicles and crew are required to transport, lay and roll the binder and chippings and these operate as a unit, commonly described as the surface dressing “train”. Narrow, lightly trafficked
roads are sometimes dressed across their full width in a single pass but usually the operation will cover one side of the carriageway and then the other. A legal order is processed to allow the roads to be closed to traffic but subject to a risk assessment, the operation will usually allow passing traffic.

15. Binder is sprayed onto the surface and immediately overlaid with a surplus of chippings (much like applying glitter to a Christmas card). The whole surface is then rolled with a specialist pneumatic-tyred roller.

16. It is a key part of the principle of surface dressing that, over time, the newly applied chippings will become depressed into the old surface, thereby becoming very strongly locked into the fabric of the road. It is for this reason that the dressing is applied in the spring and summer, when the old surface is warm and at its softest. This “embedment” of the chippings, into a relatively hard surface cannot be achieved by a single heavy rolling with a steel roller as this would merely crush the chippings. Instead, it has to be achieved by numerous light rolls over a period of time. The initial rolling begins this process but it continues over several months under the passage of traffic.

17. The surplus of chippings ensures that the binder is all coated, that there is a good interlock of chippings over time and that some protection is provided for the underlying chippings from scuffing during initially trafficking. A surplus is therefore necessary for the effectiveness of the process. ‘Loose Chipping’ sign boards and advisory speed limits are displayed on all sites up until the site is considered to have settled down adequately, usually after 3-4 weeks.

18. Immediately after application, the dressing is very vulnerable. Light sweeping only is possible in the early days and heavy braking or turning movements are liable to scuff the surface. Modern power-steering has created particular problems where dressing is applied near driveways or in turning areas/alu-de-sac.

19. A follow up sweep continues for approximately three weeks after the dressing and subject to the behaviour of each site. After this, any remaining white lines will be repainted and the loose chippings signs removed.

20. All of the sweepings are reprocessed (washed and graded) and then re-used on further dressing sites.

**Critical Factors**

21. When laying, both the binder and the original road surface are sensitive to weather. Surface dressing cannot be applied during wet conditions or when temperatures are particularly high (i.e. through a summer heat wave) and so the programme will be delayed when these types of conditions arise.

22. During periods of hot weather, the operation may therefore be rescheduled to start very early or finish late in order to gain advantage of more appropriate ambient temperatures.

23. The dressing remains vulnerable through the first winter; embedment of the chippings is not always complete. The new binder continues to stiffen and the old road becomes very hard if temperatures drop significantly and loses its adhesive
quality. All of the previous year’s sites are therefore monitored over the winter and a full check is undertaken during March. It is usually necessary to undertake additional sweeping of a handful of sites where further chipping loss has occurred and occasionally the loss is significant and the site will be earmarked for remedial work.

Communication

24. The annual surface dressing programme is reported to Members routinely through the standing maintenance and improvements report included within the papers of each Highway Forum.

25. This same programme, with some indicative programme dates is also shared on the County Council’s website from a few weeks before the dressing commences and is updated throughout the season.

26. For the coming 2014 season, this information will also be available to the Customer Service Centre and its agents will receive a daily update of the sites completed.

27. A further new initiative in 2014 will be advance warning signs, attached to street furniture at locations where there are a number of properties. These signs will simply indicate that dressing is due within the next fortnight. Unfortunately, because the operation moves rapidly but can also be delayed by weather and other incidents, it is very difficult to give a confident indication of the likely date and time that each site will be dressed until the receding day.

28. The day prior to dressing, letters are distributed to all properties at locations where dressing is expected. The letter confirms that the process will take place the following day and provides advice about loose chippings and the need to keep the carriageway clear of parked vehicles.

Traffic Management

29. It is sometimes necessary to close roads for surface dressing but, in the majority of cases, traffic is managed by stop/go boards or occasionally by temporary lights. There is sufficient flexibility in a programme as large as this to avoid critical sites at peak periods and so delays to traffic are usually minimal. Some frequently busy roads will be scheduled to either an early start or Sunday working.

Benefits/Lifespan

30. The benefits of dressing in terms of minimising expensive pothole and patch repairs and maintaining the life of the underlying fabric of the road has been previously described. Not every road surface is suitable for dressing and not every surface benefits in the same way. However, as a generalisation, a new surface (if it is not dressed) will begin to show signs of pothole development and fretting of the surface, after between 4 and 10 years. It would be likely to require substantial repairs and perhaps full renewal after between 6 and 12 years. This model of deterioration can often be seen in private car parks where dressing is frequently overlooked.

31. However, if a dressing is applied in the early life of the new surface and then the surface is redressed on a cyclical basis, then a road with a good foundation and
adequate drainage can continue in a sound and serviceable condition for many decades.

32. The typical costs of the various treatments described in this report are provided below.

<table>
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<tr>
<th>Treatment</th>
<th>Typical Cost</th>
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<tr>
<td>Full carriageway resurfacing</td>
<td>Between £8 and £20 per square metre.</td>
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<tr>
<td>Carriageway surface patching</td>
<td>Between £20 and £60 per square metre and a reduced lifespan compared to full resurfacing</td>
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<tr>
<td>Pothole repairs</td>
<td>Between £80 and £200 per pothole, with further repairs likely in the not-too-distant future</td>
</tr>
<tr>
<td>Surface dressing</td>
<td>£1.75 - £2.50 per square metre, although in some locations, preparatory costs can raise this to around £3 - £4</td>
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33. Surface dressing is therefore an extremely cost-effective and vital process that keeps Leicestershire’s roads in a serviceable condition year on year and reduces the requirement for more costly interim repairs.

34. It is however important to recognise that surface dressing is not a cure-all. It primarily protects the surface of the carriageway from wear and tear. It does help limit deterioration due to deeper foundation weakness (by sealing cracks, keeping moisture out and slowing the development of potholes) but, when used on roads with insufficient structural strength, its benefits diminish. Many of our rural roads have no formal construction and parts of the main road network have limited construction. These roads, when they are subject to additional traffic stress due to increasing flow or vehicle size, are prone to structural failure. Whilst surface dressing may help delay the process, the appropriate treatment is to strengthen or manage the road, until it is in a condition where a regime of surface dressing is again the viable maintenance option.

**Equal Opportunities Implications**

35. There are no specific implications within this report.

**Recommendation**

36. It is recommended that Members note the contents of this report.

**Officer to Contact**

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**Background Papers**

None