

Open Report on behalf of Richard Wills, Executive Director for Environment and Economy

Report to:	Highways and Transport Scrutiny Committee
Date:	13 July 2015
Subject:	Highways Surface Treatments

Summary:

This report provides information to the Highways and Transport Scrutiny Committee about the surface treatments used to maintain the highways network and their contribution to delivering the strategy outlined in the Transport Asset Management Plan.

Actions Required:

The Highways and Transport Scrutiny Committee is invited to consider and comment on the report.

1. Background

1.1 Surface treatments are used extensively on the Lincolnshire highways network to protect carriageways from the ingress of water and to improve the texture and skidding resistance of the running surface. This is a far more sustainable and cost effective approach than allowing roads to deteriorate to a poor condition requiring more costly intervention.

In Lincolnshire we generally use

- Single layer Surface Dressing - This is a single layer of bitumen emulsion followed by the application of single sized uncoated chippings (typically 10mm). This variant is generally deployed on more lightly trafficked roads where stresses due to traffic tend to be lower.
- "Racked in" Surface dressing - This is a single layer of bitumen emulsion followed by a 10mm or 14mm uncoated chipping which are then "racked in" with a 6mm chipping. This treatment is used where traffic stresses are higher. They are more robust and hence suited to coping with higher levels of traffic or more arduous traffic conditions.

- "Slurry Sealing" – This is a mix of bitumen emulsion, graded fine aggregate and filler. This technique is used on urban roads and is more successful where traffic volumes and stresses are low. A variation of this technique is frequently used to maintain the surfacing to bitumen bound footways.
- 1.2 These products and process will not improve the "ride quality of the surface, however, by preventing the ingress of water they will extend the structural life of pavements and footways by arresting or reducing deterioration. Many of our lower class roads are largely comprised of multiple layers of Surface Dressing.
- 1.3 On very minor, lightly trafficked roads the "Retread" process is used to re-profile the carriageway and seal it. This involves scarifying and rolling the surface, with additional material where required prior to Surface Dressing. The surface is then treated with a 2nd layer of surface dressing during the following year. This process is particularly useful for managing those parts of the network affected by drought. Sites treated in this way do require more frequent monitoring to ensure further surface dressing is deployed in a timely way and they will suffer rapid deterioration if the surface does not remain sealed and waterproof.
- 1.4 Where sites are identified which are unsuitable for surface dressing or slurry sealing a new surface course (40mm) is applied. This is normally Hot Rolled Asphalt, Thin Surfacing or Close Graded Surface Course depending upon the nature of the site and levels of traffic. These materials are considerably more expensive to lay but have a longer surface life and will also improve ride quality. The life of a surface course can also be extended by the application of one or two layers of surface dressing before it requires replacing.

The following table outlines our estimated spend in 2014/15 on various surface treatments

Material	Estimated Spend
Surface Dressing	£7.7m
Slurry Sealing	£0.3m
Retread	£1.1m
Hot Rolled Asphalt	£4.8m
Thin Surfacing	£0.3m
Close Graded Surface Course	£1.8m

1.5 SITE SELECTION

Surface dressing binders are a modern, highly technical product. They have to be spray applied in a controlled process and quickly develop the strength to hold the aggregate in place in a high stress environment. In the UK surface dressing is designed in accordance with the national guidance document; Road Note 39. This guidance document has recently been reviewed and a new version is awaiting publication. A draft version of the revised code has been reviewed by officers and no significant changes are proposed which affect the choice of materials available.

In Lincolnshire sites are selected for surface treatment based upon surveys undertaken by the laboratory (SCANNER, SCRIM Deflectograph and CVI) combined with local input from routine safety and condition inspections. The county also has a programme of sites where "Thin Surfacing" is treated with surface dressing to extend the life of the surface.

These "Thin Surfacing" sites present a particular challenge as when left untreated they can fail rapidly particularly during the winter months. The standard treatment for these sites is to use a 14mm/6mm "Racked In" dressing at the point when deterioration is evident and to follow this with a 10mm/6mm "Racked In" dressing when the first treatment reaches the end of its life. This approach has been used successfully on large lengths of the former Trunk Road network (e.g. A17, A46, A15 etc.) to mitigate the problem of failing "Thin Surfacing" and to effectively "sweat" the asset in line with the strategy set out in our Asset Management Plan.

- 1.6 The use of 14mm chippings as part of the Racked-In process requires some consideration for noise and is generally avoided in urban and environmentally sensitive areas. However, once applied the noise level will reduce over time as the chippings embed. One of the advantages of using a 14mm chipping is that as the dressing approaches the end of its service life an application of 10mm chippings, as a further Racked-in dressing can be applied to the surfacing before the whole surface course is replaced. This provides considerable benefits in terms of the whole life cost of the works.

It is not good practice to apply a further 14mm/6mm Racked-In dressing over an existing 14mm/6mm Racked-In dressing. Likewise the application of a 10mm/6mm Racked-in dressing over an existing 10mm/6mm Racked-In dressing is normally avoided as the amount of binder required to achieve satisfactory chipping retention can result in an with upward migration of the binder to the surface resulting in excessive chipping embedment and "fatty" binder rich wheelpaths which can give rise to a reduced skid resistance.

1.7 For Surface Dressing in urban areas where there are issues with parked cars, tyre screwing and problems with potential complaints from house holders a premium polymer modified binder can be used but this may not eliminate all chipping loss or binder migration. The extent of difficulties can sometimes be over stated and these sites can be more time consuming for the contractor and increase costs through lower output.

1.8 Slurry seal can be used as a carriageway treatment with reasonable success in lightly trafficked urban locations but are these are not without service life issues such as loss of texture, de-bonding and poor visual appearance. Slurry seal is therefore mostly used as a treatment for footways.

1.9 Noise

Noise is defined as unwanted sound and tyre/road noise forms part of the overall noise that is an inevitable consequence of a mature and vibrant society. Currently there are no European or national noise limits which have to be met.

The application of surface treatments extends the life of a pavement and restores texture and skid resistance. This increase in surface texture can result in an increase in road noise. The effect of these changes will diminish over time as embedment occurs.

1.10 The Department for Transport Design Manual for Roads and Bridges Volume 11: Environmental Assessment contains guidance on the assessment of the impacts on levels of noise and vibration. This categorises the long term impacts of noise level increases in accordance with the Table below:

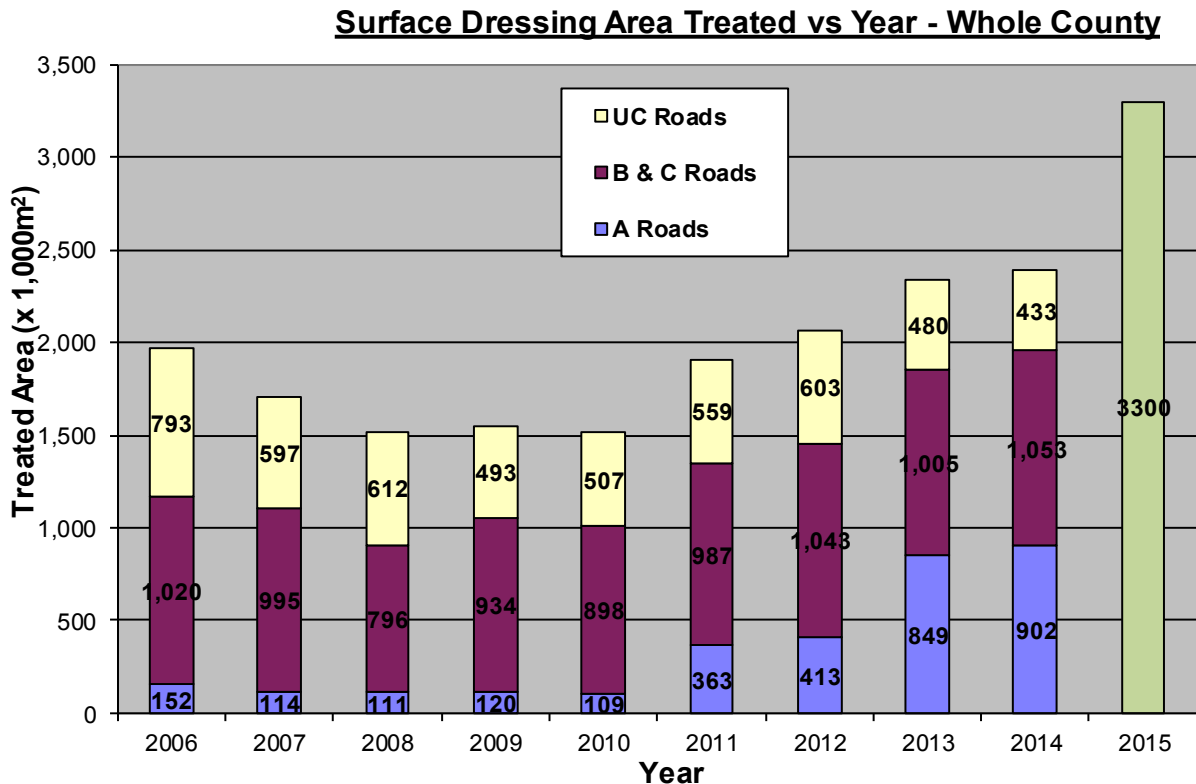
Noise Change (Decibels)	Magnitude of Impact
0	No change
0.1 - 2.9	Negligible
3.0 - 4.9	Minor
5.0 - 9.9	Moderate
10+	Major

1.11 The results of work carried out by the Transport Research laboratory show that the difference in noise levels between different surface materials is no more than minor. Therefore, whilst this factor is considered as part of the choice of surface material, it is unlikely to outweigh the engineering properties, existing condition, dimensional constraints, material lifespan and whole-life cost of the material for any particular road.

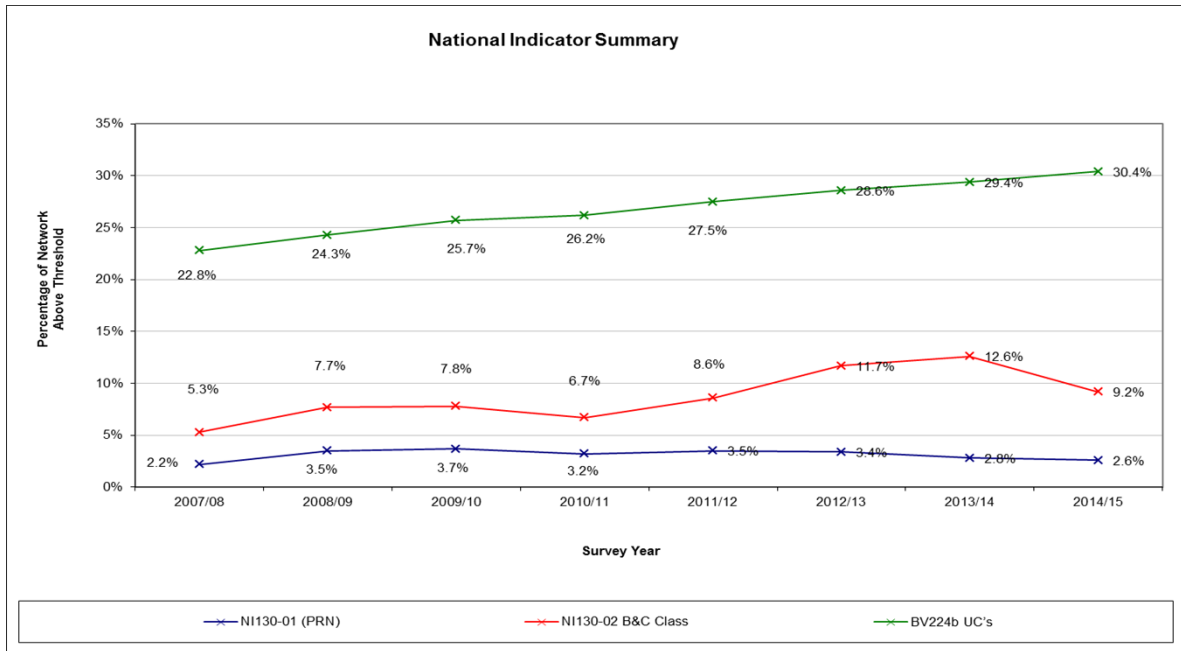
1.12 The perception of noise remains a concern and in September 2014 a petition was received relating to work carried out on A158 at Burgh le Marsh. This was presented to Full Council in December 2014.

- 1.13 In response to local concerns an independent noise survey was carried out to establish noise levels. Noise is usually expressed in decibels (dBa) and the highest noise level recorded at adjacent properties was 59.0dBa. Whilst no 'before' readings were taken the findings were in line with those predicted. The Environmental Statement for Burgh le Marsh Bypass at planning stage predicted an expected noise level of 58.0dBa.
- 1.14 In relation to the above it is worth noting that for new construction the Noise Insulation Regulations (1975) place a duty on Highway Authorities to offer insulation at a predicted noise level of 68dBa. As decibels are measured on a logarithmic scale this is more than double the noise recorded at adjacent building facades at Burgh le Marsh.
- 1.15 Further work is being commissioned this year to measure noise levels produced by different road surfaces around the county.
- 1.16 Treatment Areas and Condition

In previous years Lincolnshire in common with many other authorities saw a reduction in the use of Surface Treatments and this has contributed to the decline in the overall condition of the network. The following graphs illustrate our use of Surface Dressing has changed between 2008 and the current year and the condition of the network.



Carriageway Condition Indicators



1.17 SERVICE LIFE AND COST

When applied correctly surface dressing will last a considerable number of years. The following table outlines the typical cost and service life of a range of treatments together with the comparative costs for conventional resurfacing.

Surface Treatment Costs

Treatment	Application	Cost per m ²	Service Life
10mm Surface Dressing	All roads except where heavily trafficked	£2.00 to £2.50	6 to 12 years
14/6mm Racked In Surface Dressing	Heavily trafficked roads only	£2.60 to £3.20	10 years
10/6mm Racked in Surface Dressing	Main distributor Roads	£2.50 to £3.00	8 years
Slurry Seal - Carriageway	Urban areas with minimal traffic e.g. cul-de-sacs	£3.00 to £4.00	6 years
Retread Process	Lightly trafficked minor roads	£13.00 to £14.00	6 years plus

Comparative Costs of Other Treatments

Treatment	Application	Cost per m²	Service Life
Resurfacing – Hot Rolled Asphalt	Heavily trafficked roads and junctions	£10.00 to £15.50	20 Years plus
Resurfacing – Thin Surface Course	Heavily trafficked roads	£9.00 to £13.50	8 to 10 years
Resurfacing - Close Graded Wearing Course	Low traffic roads and urban areas	£7.50 to £11.50	10 to 15 years
Slurry Seal – Footway	All footways	£2.50	10 Years

2. Conclusion

2.1 Surface Dressing is the treatment of choice for many locations. It is the right product for many sites and provides significant benefits in terms of whole life cost, speed of application and the efficient use of bitumen and high quality aggregates.

Slurry Surfacing is the right product for a more limited range of sites and is, effectively, restricted by its performance characteristics to urban locations.

Our Asset Management Plan has been approved by members and the adoption of the principles outlined in the plan has reversed the decline in the use of Surface Dressing and Surface Treatments.

2.2 This approach is supported by the Department for Transport (DfT) through their Highways Maintenance and Efficiency Programme (HMEP) and this will form part of the efficiency measures the DfT will expect to be applied if we are to protect our share of the recent increase in the highways maintenance grant.

3. Consultation

a) Policy Proofing Actions Required

n/a

4. Background Papers

The following background papers as defined in the Local Government Act 1972 were relied upon in the writing of this report.

Document title	Where the document can be viewed
Lincolnshire County Council - Transport Asset Management Plan 2012-2016	www.lincolnshire.gov.uk

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