

Thin surfacings, as currently defined, have become the surfacing of choice for many highway authorities, but there are concerns about their overall performance. From his experience and current research, TRL research fellow Dr Cliff Nicholls (MIHT) offers his view on the results of an IHT survey of thin surfacing issues concerning highway engineers.

Thin surfacing: a performance update

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Introduction

This paper forms an update of continuing research into the overall performance of thin surfacings. It has been written using data from a number of sources. IHT has shared the findings of its 2001 user survey of thin surfacing performance with TRL, which had been appointed to carry out further research on the subject by the Highways Agency and the purveyors of various thin surfacing systems. The results of IHT's survey were reflected in the initial TRL research published in November 2002 in TRL 557. A full version of the following paper draws on the TRL 557 data and subsequent developments and is open to technical discussion in the IHT Members Forum at www.iht.org. Members are invited to aid further research by contributing factual data from their own experience.

The current status

Early "thin surface" systems were monitored as trials by TRL on behalf of the Highways Agency. From the results, thin surfacing systems were included in the Specification for Highway Works. The requirement is for the system to be approved. Initially this was done by the Highways Agency itself, but more recently through a British Board of Agrément Highways Authorities Products Approval Scheme (HAPAS) certificate. The concept is for this certification to be used for local roads as well as for trunk roads.

HAPAS certification applies to the manufacture of the product, but the certificate holder is responsible for ensuring that the paving contractors have adequate skills to lay it. Some

producers have almost identical certificates for their products under different trade names, one reserved for their own laying gangs and one for other firms who they have licensed to lay the product.

The thickness requirement of thin surfacing has been increased recently to 50mm to alleviate problems when inlaying after planning off an existing 45mm or 50mm thick surfacing. For the purposes of this article, a thin surfacing is taken as a surfacing system that has obtained, or could obtain, a HAPAS certificate, whether it be thin or thick, hot mix or surface treatment.

Surfacings can be categorised in several ways. However, the simplest approach is to consider the material type from which they were developed. In this way, the categories currently available are:

- Micro surfacing (thick slurry surfacing).

- Multiple surface dressing.
- Paver-laid surface dressing.
- Thin asphalt concrete.
- Thin stone mastic asphalt.

These categories are not necessarily given in a HAPAS certificate because the scheme does not subdivide systems other than for depth.

However, the micro surfacing and multiple surface dressing systems should be self-evident from the description of the processes while, for the hot mix systems, a paver-laid surface dressing has dedicated plant to lay it, a thin asphalt concrete uses polymer-modified binder in the mixture and a thin stone mastic asphalt uses fibres.

Durability monitoring

TRL is currently investigating a series of sites to assess the durability and common modes of failure of thin surfacing on behalf of the Highways Agency. From the visual assessment

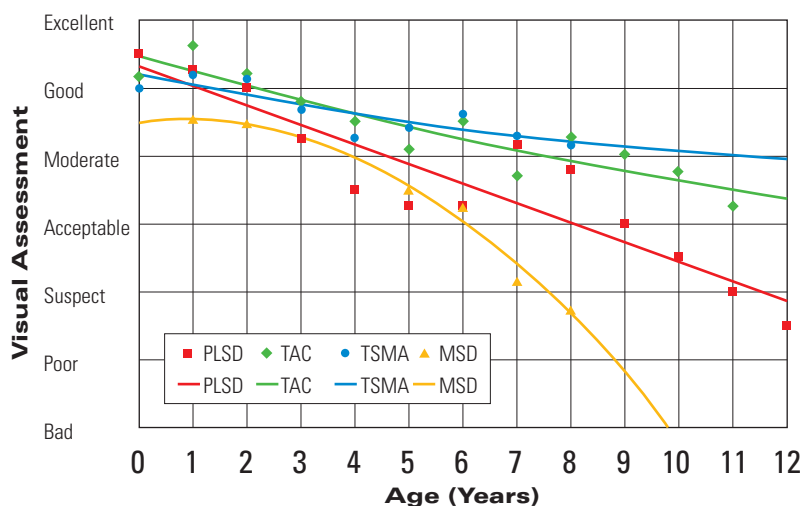


Figure 1: Average visual assessment ranking for monitored systems by category

Category of surfacing		Should be replaced	Must be replaced
Paver-laid surface dressing systems (PLSD)		11.5 years	18 years
Thin asphalt concrete systems (TAC)		25 years	not identified
Thin stone mastic asphalt systems (TSMA)		not identified	not identified
Multiple surface dressing systems (MSD)		7.5 years	10 years

summarised in Figure 1 (which incorporates 2002 and 2003 data not in TRL 557) the above is a tentative attempt to predict average service life until the surfacing should ideally or must be replaced.

It should be noted that the values take no account of loss of other properties, such as skid resistance, and are therefore upper bounds (if validated) on the actual life of a typical thin surfacing. Furthermore, rankings may be biased by the use of early sites. Nevertheless, these values are in excess of the eight to 10 years put forward when the systems were first introduced.

Very few failures have been reported and most of the older sites were still extant at the time of writing. The failures that are known of tend to have been caused by either construction faults (the thinner the surfacing, the more sensitive it is to workmanship) that are not directly relevant to this investigation; or poor site conditions, which encouraged those responsible for the maintenance of the site to offer it for use as a trial initially. Overall, the results demonstrate that routinely, thin surfacing systems can be constructed successfully to provide a safe surfacing with adequate skid-resistance, texture and visual condition

and that these properties are maintained. Therefore, the evidence supports the use of these systems on trunk roads in England by the Highways Agency.

Issues of Concern

The following issues of concern have been identified and are discussed in the full paper on the IHT web site.

- Purpose and application
- Installation
- Safety
- Function
- Durability
- Sustainability
- Guarantees
- Cost

Many of these issues will not be resolved until further research is undertaken and all current experience is evaluated, which is why IHT members' feedback is vital and encouraged.

Conclusions

Overall, the availability of thin surfacing systems is a useful extra tool in the armoury of highway engineers that is worthy of wide, but not exclusive, use on a variety of networks. Thin surfacing systems should be widely used, but not indiscriminately nor without due care and diligence.

A full length version of this paper can be found in the IHT Members' Forum at www.iht.org.



Dr Cliff Nicholls (MIHT) is a research fellow of the Infrastructure division at TRL. His work primarily involves research into asphalt surface course materials including surface dressing, porous asphalt and high friction surfacings as well as associated materials such as road markings. As well as an author of several TRL reports and publications, Dr Nicholls sits on bitumen and asphalt committees of CEN (Comite Européen de Normalisation), the British Standards Institution, the Energy Institute (previously known as the Institute of Petroleum) and specialist groups for five categories of HAPAS.



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