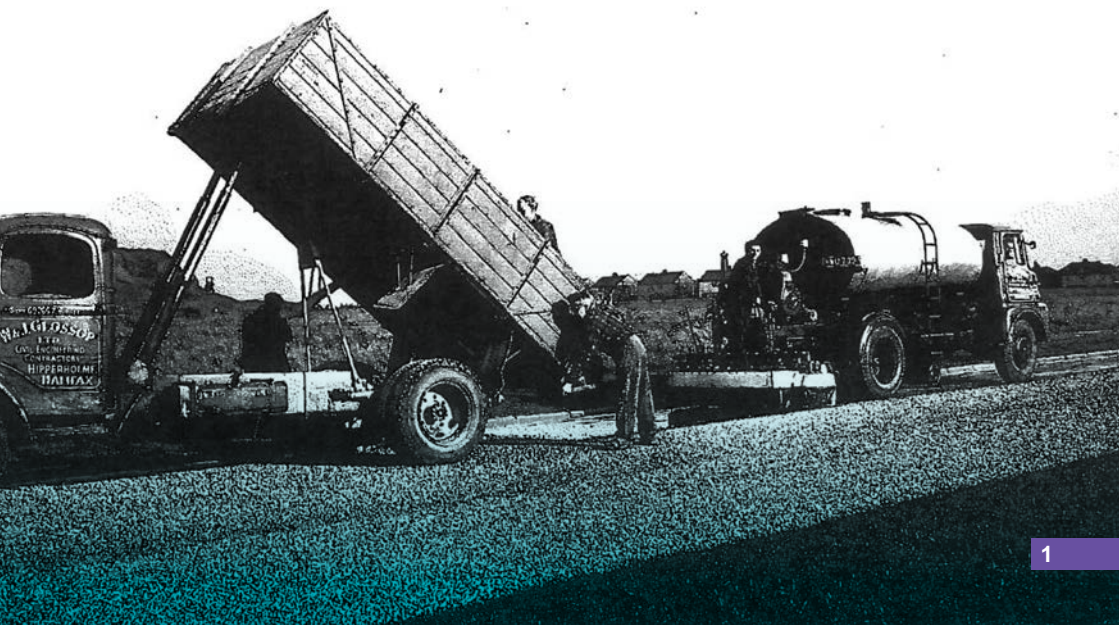


Experiences in Surface Dressing

A personal memory by Arthur Thompson

Surface dressing of roads has been a tried and tested maintenance practice for many decades. It is a cost effective method of increasing the life of a road by restoring skid resistance and sealing the road surface from water ingress.

However the continuing development of new and improved materials and techniques has been an essential part of that process. Arthur describes how surface dressing evolved over his 40 years in the industry.



Surface Dressing

Surface dressing is a cost effective method of increasing the life of a road. It involves the initial spraying of a bituminous adhesive coat onto the existing road surface, followed by the spreading and rolling in of aggregate chippings. It is used to provide the road with a new wearing surface which has increased skid resistance (to aid braking), seals the surface from water ingress and which also arrests disintegration of the old surface.

Motorists will recognise the ‘loose chippings’ signs that often accompany surface dressing works. In the settled condition there is a roughness to the surface that reduces the chances of skidding even in very cold, icy conditions. It does generate some tyre noise, meaning it is more often seen on minor rural roads and relatively quiet urban roads,

Having been involved in the surface dressing industry for the past 40 years I have seen many changes, both in operations and design specifications. I’ve also worked with both private sector and highway authority Direct Labour Organisations (DLOs).

In the early 1970s, several DLO’s of county council authorities in the North East, west of England and Scotland, were dominant in the surface dressing industry, due to it being a significant element of their highway maintenance budgets and programmes.

Some of these authorities specified various methods and applications of binders (the adhesive coat) and chippings. For example in the early 1970s such binders used were EV30 tar, which was a by-product from the coke industry. Other products preferred were so-called Cut-back Bitumen or Tar-bitumen blends.

These bitumens were applied at high temperatures. They were heated beyond their flash points, when the vapour released could ignite in the air. Consequently, on application to the road surfaces, there was always an attendant fire risk to the surfacing crews. Their use eventually declined as more robust Health and Safety practices were developed.

Very few designers continued to specify Cut-back Bitumen when an alternative Bitumen Emulsion Binder was introduced to the industry. These new materials were generally 70% binder and 30% water, or occasionally a 80% / 20% mix, which were more suitable with damp surfaces and chippings. The Cut-back Bitumen traditionally required a perfectly dry surface and chippings.

One addition to the bitumen road binders was a revolutionary additive called “Emulcol” produced by Colas Ltd, and which was developed by Colas France. This was an additive sprayed into the jet pattern of the conventional Bitumen Emulsion, as it is applied to the road surface, which gave the application a much faster breaking time – the time the bitumen in the emulsion takes to coalesce and develop an early bonding strength between the chippings and the road surface. This faster process enabled the road to be returned to traffic much sooner.

I applied this system to the Holy Island Causeway in the 1980s. The tidal effect on the original Macadam surface layer was so severe that sections became un-bonded from the base course below. The application of a surface dressing using “Emulcol” additive proved very successful and the treatment remained effective for many years. It proved a cost effective solution for Northumberland County Council for maintaining the causeway’s surface.

The application of chippings during the late 1970s and early 1980s varied between using a single or double application of binder. These used a range of aggregates which were waste products from industrial processes, such as Blast Furnace Slag and Steel Slag, and locally

produced aggregates such as Gritstones and Basalt. Depending on the traffic conditions and stress levels of the carriageway, a single dressing using a 6mm or 10mm chipping would be specified, or alternatively a double dressing using a 14mm or 10mm followed by a 6mm or 3mm chipping.

During a business trip to France in the early 1980s I saw a technique called “Racked-in surface dressing”. It consisted of a single heavier application of Emulsion Binder followed by 14mm chippings which were applied at a much lighter rate of spread and which were infilled with a 6mm or 3mm chipping. This in theory interlocked both aggregates into the binder. The process was generally used on high speed roads in France giving a better combination of a smooth ride but with sufficient surface texture (skid resistance) to aid vehicles braking.

Eager to develop this system in the north of England, I contacted a materials engineer (Jeff Higgins) working for Cleveland County Council (CCC) who confirmed his interest. Working with CCC laboratory facilities, we developed the required quantities of binder and aggregates and, in due course, convinced CCC to carry out a trial where the new technique could be used and monitored over a specific time. The aim was to convince them to introduce the system into their annual Surface Dressing Programme.



The trials proved successful, after which the first “racked-in” system was applied to a major trunk road in Cleveland in 1982. Further development tailored it for highly stressed roads – high speeds and heavy goods vehicles – where conventional surface dressing would have previously been at risk of failure.

Encouraged by the success at Cleveland, I introduced the new system to Durham and Northumberland County Councils as a method to surface dress roads normally unsuitable for conventional dressings. It was referred to as “Proprietary Surface Dressing” as opposed to “Conventional Surface Dressing” – the two terms used to distinguish between products when surfacing work was specified to contractors.

Another innovation I was involved with in its infancy was a system called “Fibredec” – a sealing process developed to treat severely cracked or crazed roads normally unsuitable for conventional surface dressing. Using chopped glass fibres in the Bitumen Emulsion and various sized aggregates provided a deterrent against cracking from failures below the surface. The process proved so successful it was also used on unmade footways and cycleways.

Within the industry we have been guided for designs by TRRL RN 39 for as long as I can recall. Modern designs have proven to be a great success and, while quantities of surface dressing in the UK have declined over the past few years, materials development has meant the process is still economic and practical.

Having now retired, I fondly look back on many memorable years spent in the industry, my involvement with the region’s highway maintenance programmes and, in particular, to the various characters I met and worked with.

Thanks to Arthur Thompson FICHT, at New County Group, for preparing this article.

All opinions in this article are the author’s own.