

## **Benefits of using Bitumen Emulsions during periods of fiscal restraint**

### **Introduction**

Preserving pavement integrity by the timely use of bitumen emulsion based surface treatments is a particularly attractive option for highway authorities endeavouring to maintain assets in the most cost effective manner. The UK is now in a period of severe fiscal restraint, coupled with strict imposition of carbon accounting to offset climate change. This paper draws attention to surface treatments that help preserve pavement integrity, even through major weather events such as those experienced over the last two winters, in a way which is relatively low cost and of minimal environmental impact.

### **Changing Attitudes**

Roads are major national assets, in terms of the social and economic benefits they present; and as such it is vital to maintain their value. Pavement preservation is never more important than now, and it is a well established fact that maintaining the integrity of a road surface requires timely and appropriate intervention.

In the UK, prescribed treatments and schedules vary to an extent but now all highway authorities and asset managers are coming under pressure from changing financial priorities and reducing budgets, with environmental considerations and low carbon options becoming increasingly factored into maintenance choices.

Whether directly related to climatic change factors or not, different regions of the UK can be subjected to extraordinarily severe weather. Unmanaged, in a maintenance sense, water, snow and ice from such an event can be a catalyst for pavement failure well before reasonable expectation.

### **Pavement Integrity**

The surface of any carriageway provides the key interface between the end user, the performance of the road and the integrity of the pavement. During the life of the pavement, it is the surface that is subject to the most onerous conditions of direct traffic loading and weather related problems of waterproofing and temperature extremes.

Pavements tend to gain strength and stiffness as they mature. This provides increased resistance to the cumulative effects of higher traffic volumes and heavier loading. However, at some stage the optimum health of the pavement surface including skid resistance is passed and the pavement itself can be subject to severe trauma if this condition is allowed to go unchecked.

If the integrity of the surfacing has been breached, the extent of the failure tends to increase rapidly. Ingress of water into and through the pavement followed by freeze/thaw inevitably causes serious structural problems. During the most recent harsh winters many roads suffered an increase in surface failures, mainly potholes, degradation around ironwork and unravelling of construction joints.

Localised patching and repairs generally provide a costly and increasingly politically “difficult” solution to the problems, and many such repairs are considered as “temporary” by the travelling public. There is demonstrable evidence that intervention with bitumen emulsion based surface treatments like surface dressing; slurry and microsurfacing would have prevented many of these repairs.

### **The Surface Treatments Options**

Surface dressing and slurry surfacing are both time served, relatively low cost maintenance options used throughout the world. These processes requires low levels of natural resource, are quick to undertake with minimal disruption to road users and generate comparatively few emissions as both are cold processes requiring little heat.

Crucially, they seal old road surfaces and reduce water getting into the pavement. They are not intended to add to the structural integrity of the pavement being treated, but to safeguard the pavement structure itself by extending the pavement’s life.

The key to the success of these treatments is the new bitumen emulsion binder film provided that helps road surfaces to better endure years of trafficking, weather cycles and very often utility reinstatements. The scrubbing action of tyres and surface detritus wears the original binder film off the exposed surface. In combination with the ageing effects of UV light and the wetting/drying action of the rain, sleet and snow, the years take their toll.

The timely application of the new surfacing reseals the road surface and retards the onset of that critical level of strain which results in premature failure induced by freeze/thaw conditions.

Binder choice is important and the emulsion manufacturers offer a wide range of unmodified or polymer modified binders.

### **Conclusion**

It is often cited that prevention is better than cure, and evidence from across the UK - badly hit especially in the 2009/2010 winter by severely cold and wet weather - indicates that worn surfaces routinely maintained using low cost treatments suffered greatly reduced occurrence of potholes and joint unravelling.

Surface treatments are relatively eco-benign and highly effective and relatively low cost means of substantially extending pavement life and prolonging the network of highway assets. They are particularly suited to times of financial restraint and increasing climatic change concerns.