

# “ PPP ”

## People for Proper Policing in North Wales

### A summary of road surfacing options and characteristics

From our expert.....

**Stone Mastic Asphalt (SMA)** was starting to become popular in the UK about seven years ago (**1998**) and its use has increased a lot since. It is seen **as a cost effective alternative** to conventional **hot rolled asphalt (HRA)**.

Conventional HRA is paved hot and then, before compaction, coated chippings are compacted into the surface to give surface texture. The chippings are rolled into the surface whilst the asphalt is hot and the aim is to have a minimum final texture depth of about 1.5mm.

**If the chippings are rolled in too far then there is poor surface texture and if they are too proud then there is a danger that they will be removed by traffic.** The reason chippings can be rolled into HRA is that it contains over 60% sand and filler, and this rich mortar, allows for chipping penetration. Because of the large total surface area of all the particles it **requires a lot of bitumen to bind HRA together.**

SMA on the other hand consists mainly of a stone grading with a much smaller amount of filler. As the total aggregate surface area is much smaller it requires much less bitumen to bind it. HRA wearing course (top layer) is typically laid at 50mm thickness and needs to be because the rolled in chippings are 20mm nominal size. **If it was laid thinner its overall strength and fatigue resistance would be compromised.** Because SMA has such a high stone content it is impossible to roll chippings into the surface so what comes out of the paver is the final product. It requires less compaction than HRA and it is typically laid at about **30mm thickness. This reduced thickness and lower binder content lowers the cost of road resurfacing quite dramatically.**

The objective was to be more cost effective rather than compromise on safety. A lot of development work would **no doubt** have been done to test its durability and resistance to rutting. I'm not sure how much work has been carried out on **in-situ skidding resistance, probably not much**, judging from what we are experiencing in Ireland and elsewhere. It seems likely that skidding resistance will have been assumed to be satisfactory based on known results on the skidding resistance of the aggregates used.

**Excess bitumen at the surface will have been assumed to disappear quickly under trafficking. With hindsight more should have been done to determine initial skid resistance after laying and ongoing assessment to check when it reaches the desired value.**

**Hot Rolled Asphalt is peculiar to the UK** and came into use because of the large quantities of high stability sand available which eked out localised sources of aggregates. Bear in mind that south of the Midlands there is virtually no significant sources of suitable aggregates for road building. Aggregates used in asphalt made in Southern England will have been transported from Scotland, The Pennines, North Wales and even Ireland. Outside the UK, on the Continent, USA and other parts of the world the traditional paving material is called Asphaltic Concrete (AC) laid at the same thickness as HRA.

This contains a more or less continuously graded aggregate ranging typically from 14mm down to 75mic. A small amount of limestone or other suitable filler may be added to complete the mix. The bitumen content, whilst higher than for SMA is less than used for HRA. The continuous aggregate grading gives high mechanical stability due to the aggregate particle interlock and as such is a more sensible material altogether than HRA which is a gap graded mix more akin to a plum pudding.

As with SMA it is not possible to roll chippings into the surface and it relies on trafficking to wear away the bitumen at the surface and expose the aggregate. With this being the standard method of paving for most of the world it is not too unreasonable to assume that SMA would be OK from a skidding resistance standpoint. Obviously from recent experience it isn't, so it may be that mainland Britain will follow Ireland's example and stop its use.

**I have been thinking about the overall situation regarding investment in the roads network and have tried to put a few things into some sort of perspective by asking myself how did things go so badly wrong.**

Staffing levels in the Industry, Local Authority Highways Depts, Highways Agency, Transport Research Laboratory etc. have been steadily reducing since the mid 1980's. Despite this the intentions to improve and extend the road network continued more or less unabated until a few years ago when the Green Lobby pointed out that building more roads results in ever more traffic. Environmental pressure was put on government to reduce the roads programme and concentrate on public transport instead. As a result a large number of road projects were postponed or abandoned which was seen as being the right thing to do at the time. Unfortunately the public have yet to be convinced about using public transport because its so much more convenient to use private transport. **As well as reducing the roads programme the government appear to have disastrously lost sight of their commitment to road maintenance** and this seems to have declined as much as the new roads programme.

**The government are going to need powerful lobbying before anything changes.** It is a great pity that the same enthusiasm isn't shown for road maintenance as is shown for the introduction of road humps and speed cameras. I think you are right to tackle things from the safety angle because this seems the main area where the authorities will take notice. Long term cost saving is another factor, using the stitch in time approach. e.g. Surface dressing (spray and chip) costs only one tenth of the cost of hot rolled asphalt. If surface dressing is abandoned then the asphalt underneath will lose its surface seal and deteriorate at a much faster rate. Any cracks in the surface are subject to freeze thawing effects in the winter which causes very rapid deterioration. **Regular surface dressing maintains good surface texture and improves skidding resistance, thereby saving lives and associated accident costs.**

There could also be a large potential cost saving if the government controlled the use of extra large agricultural vehicles which cause so much damage and yet contribute so little to road maintenance.

**PPP comment...One question comes to mind....top dressing with hot 'tar' and grey largish grade granite chippings was common practice everywhere years ago...**

Broken screens and tar splashes on bodywork were a nuisance BUT good practice could minimise both.....can you use the same technique to top dress roads initially surfaced with SMA?, are the two systems compatible

**Expert response.**

It shouldn't be a problem to surface dress over SMA. Please note that **tar has not been used for many years on health and safety grounds.** Bitumen is not classed as carcinogenic so is OK to use. The chippings you refer to would have been nominal 14mm granite. In later years the size was reduced to nominal **10mm which resulted in far less windscreens being broken.** To be able to spray the bitumen onto the road surface it either has to be applied in emulsified form or as a low viscosity cutback made by adding kerosene to the bitumen. Emulsified bitumen is usually preferred as there are less fumes and there is no flammability risk.