In-service performance benefits from asphalt on roads

There are a number of environmental benefits from use of asphalt on roads and these are discussed in the following sections.

Noise

No noise can be defined simply as unwanted or unpleasant sound. Road traffic sounds may come from the tyres, the engine and the road surface, and their vehicle engines and other mechanical parts of the vehicles.

Many modern asphalt surfaces can be tuned so that the natural frequency of the asphalt layer matches the frequency of the tyres so that unwanted sound (road noise) is produced.

Visual issues

Careful design and engineering, the visual impact of a road can be kept to a minimum. Careful consideration of visual effect, visual barriers, landscaping and visual planning are highly important. From a material point of view, visual impact can be managed to achieve a more ‘natural’ look or to reduce visual intrusions. Thin surfacing systems can be designed to do this.

Asphalt materials are available in a wide variety of textures, colours and other characteristics that can be used to create a road that is acceptable to the community. Careful design of the asphalt may contribute to sustainable use of resources.

Sustainability

Sustainability in terms of asphalt materials can be simply defined as their ability to maintain their desired design characteristics over the most environmentally, acceptable acceptable environmental life of the asphalt. This particular field has been a focus of extensive research, in order to determine how to design the sustainability of asphalt materials and highways. This can be determined through the whole supply chain, from extraction of raw materials to energy consumption during manufacture and playing and its potential for future use.

A combination of economic, environmental and social benefits is to influence the best sustainable solution for road construction and maintenance, and is carefully considered when developing that solution. Asphalt has the best transport performance, needing less asphalt materials than traditional asphalt materials. The use of asphalt materials are also likely to gain wider acceptance as the technology is still undergoing development.

Thin surfacing systems can also reduce the effects of rainfall and surface water flow over the road by providing a more even running surface than traditional positively textured (chipped) surfaces, providing a more even running surface than traditional positively textured (chipped) surfaces.

Conclusions

In summary, it is evident that the use of asphalt surfacing can provide many environmental benefits, to asphalt applications. Where 4, Quarry Products Association, London

References

2. The quality protocol for the production of aggregates from waste materials: TRL, London

For ‘Green’ Roads, the choice is clearly Asphalt – and if you really want a green-coloured road, this can be produced with asphalt – as well as red, blue or even speckled!

For ‘Grey’ Roads, the choice is clearly Asphalt – and if you really want a grey-coloured road, this can be produced with asphalt – as well as black, white or even speckled!

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Roads are a vital part of modern life which we take for granted and think little about. However, step out of your home and you will have to use roads to travel to work, shops and services and to get to and from holiday. The goods and services that we require have to be transported by road for at least part, if not all, of their journeys. There are, of course, inevitable environmental impacts from roads, but using asphalt in their construction and maintenance can help to limit the impact while improving the experience of roads for everyone.

The following extract from the Highways Agency’s Design Manual for Roads and Bridges (Volume 1 Section 1 Part 2) outlines the importance of recycling and reusing of construction materials. It is Government policy to encourage the use of alternative and recycled materials wherever possible to achieve environmental benefits such as the saving of natural resources. This information sheet explains these various benefits of using asphalt on our roads.

Recycling

Possibly the most important point to remember when considering asphalt, is that a 100% recyclable material in one way or another, either on site, or off site, asphalt is considered a recyclable material. This means that asphalt can be re-used in various applications, whether it be for road maintenance, construction or waste disposal.

One of the most common applications for re-used asphalt is the repair of clipped edges on roads. Re-used asphalt can also be used to make new asphalt for roads, footways and car parks.

The Specification for Highway Works, also issued by the Highways Agency, permits a range of inerts/materials to be included in asphalt mixes. The range of sources of secondary aggregates are now increasing and research within the industry continues to be the subject of a number of technical materials for inclusions for asphalt.

It is often assumed that recycling or using waste products will result in a savings in re-use product cost. However, it should be recognised that additional processing may be necessary in order to make such materials suitable for further use. Thus recycling or using secondary asphalt materials will not necessarily lead to reduced costs and environmental benefits will need to be weighed against costs in individual circumstances.

In another study, the use of reclaimed asphalt pavement (RAP) material is compared to new asphalt mixes in a range of test methods. The results show that asphalt containing reclaimed asphalt pavement had similar performances to new asphalt mixes. However, the asphalt containing reclaimed asphalt pavement was more cost-effective and had a lower environmental impact.

There are a number of methods for recycling of asphalt aggregates from roads during maintenance (planning) back into asphalt. These can be classified as:

- Off-site hot recycling - adding reclaimed materials to their hot-mixed asphalt (processing plant).
- Off-site cold recycling - adding reclaimed materials to their cold-mixed asphalt (use technology similar e.g. ‘Foamix’). These processes are used to reclaim binder and to re-mix the cold planings, either as found or mixed with fresh asphalt (e.g. ‘Innovatech’).
- In-situ cold recycling - as for foamed asphalt, but using emulsion binder (e.g. ‘Rebad’ or ‘Inovatec’).

The choice from this list will depend on the site circumstances. For example, off-site recycling is generally considered to be more cost-effective than in-situ recycling. However, in-situ recycling is less disruptive to traffic and road users, and has a greater potential for re-use of the recycled material, as well as reducing vehicle movements.

Recycling programs are ongoing at various locations although the projects may be subject to patient application. Aggregates are often well suited to road use in terms of quality.

It is Government policy to encourage the use of alternative and recycled materials wherever possible to achieve environmental benefits such as the saving of natural resources. This information sheet explains these various benefits of using asphalt on our roads.

Opportunities for the re-use of asphalt in the construction and maintenance stages as well as from the in-service performance of the road.

During construction and maintenance of roads and other paved areas there are opportunities for recycling of old asphalt and the use of secondary materials (which otherwise would be treated as waste) in the asphalt or elsewhere in the road structure. Additionally, asphalt in service can reduce noise pollution and visual intrusion and, through its high performance and durability, help to ensure sustainability of our natural resources.

This information sheet explains the various benefits of using asphalt on our roads.

• Recycling and the use of secondary materials in asphalt roads

Use of Secondary Materials

A wide range of secondary aggregates have been recycled as a replacement for primary aggregates in asphalt. Some of the more frequently encountered materials are outlined below:

Glass: Crushed glass has been used as an aggregate in asphalt. This glass is subjected to crushing and screening to ensure that the grading and shape are suitable to retain the engineering properties of the asphalt. The glass is also beneficial to the environment with clear benefits in the utilisation of the new generation of this surface course systems improving its resistance to load damage.

China Clay Sand: With careful site design, China Clay sand has been found to perform well in asphalt road. Large quantities of this material are available as well as those located in Cornwall, which may make handling costs to other parts of the country prohibitive.

Fibres: Fibres of various kinds are used as the production of Stone Mastic Asphalt (SMA) and many polymer modified asphalt systems. They are produced through recycling of paper and wood products. They are by far the best available and have clear benefits in the open aggregate systems of SMA and similar products.

Slate Waste: Slate waste materials are commonly used in the production of Stone Mastic Asphalt (SMA) and many polymer modified asphalt systems. They are produced through recycling of paper and wood products. They are by far the best available and have clear benefits in the open aggregate systems of SMA and similar products.

Foundry Sand: Foundry sand is commonly used in construction of foundry ladles and for similar applications. It is typical that foundry sand is used as a filler in asphalt as it is cheap and readily available. However, foundry sand is not well suited to asphalt as it is often used in moulds in foundries, and does not have the gradings and shape required for asphalt. Foundry sand is not well suited to asphalt as it is often used in moulds in foundries, and does not have the gradings and shape required for asphalt.

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