

ABOUT COLOURED COLD ASPHALTIC MIXTURES

BY

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Abstract. The first coloured bitumen was obtained by using bitumen from Peru and then bitumen from the Middle East, with a low content of asphaltenes, also called "colourable" bitumens. The colours obtained by adding iron oxides led nevertheless to dark colours, due to the presence of asphaltenes. Nowadays the coloured asphalt is obtained from synthesis binders with translucent aspect. The colours are obtained by adding inorganic pigments, mainly iron oxide for red, chromic oxide for green, titanate dioxide for white. The properties and behaviour of the coloured bitumen during its lifetime are comparable with the ones of classic bitumen, sometimes even better.

Key Words: Coloured Bitumen; Asphaltic Mixture; Slurry-Seal.

1. Introduction

Almost all the technologies for the application of the classic bitumen may be used for the synthetic binder, provided perfect cleanliness of the processing gears, transportation equipment and equipment for the performance of the works in order to avoid the deterioration of colours through the contamination with traces of black bitumen.



Fig. 1. – Coloured asphalt laying.

The peculiar properties of the coloured asphaltic coatings offer special advantages in comparison to the classic ones namely

- a) the replacement of the black colour results in the decrease in the temperature of the running surface in the hot season, which leads to the improvement of the thermal protection of the asphaltic layer and the reduction of its waste in time;
- b) the effect of the photometric properties of the coloured coatings is the improvement of the degree of perception of obstacles during the night;
- c) the varied colours – brown, red, green, blue, pink, yellow, beige, ochre, etc. – offer the net advantage of a unequaled visual comfort of the traffic participants and a pleasant aesthetic effect of the urbane landscape.

In the big European cities, the coloured asphaltic coatings are used with the purpose of additionally visually indicating the entry to the cities or the rotary intersections, the differentiation of spaces with special destinations, such as circulation or station areas for buses, vehicles, bicycles, warning the traffic participants regarding the areas with high risk of traffic accidents: rotary intersections, pedestrian crossings in very busy zones.

2. Technical Request

The colourful asphaltic emulsions are obtained by means of the same procedures and with the same plants as the classic emulsions. Depending on the application technology, several types of emulsions may be made, such as coloured asphaltic emulsions with quick, semi-slow, slow or stabile breakage to cement, with or without addition of latex modifiers.

Cold-prepared asphaltic mixtures can be obtained in special industrial plants or concrete mixers, similarly with the cement concrete. Their application may be carried out with special equipment, the same as for classic mixtures, with black or manual bitumen [2].



Fig. 2. – The methodology most often applied is the preparation and manual cast of coloured asphaltic mixtures, especially in small-sized places.

The use of plants for asphaltic mixtures and application equipments is relatively reduced due to their high productivity. Because of the high costs of the road construction works for the application of coloured asphaltic coatings, they are not carried out regularly or in vast works.

Another disadvantage of the use of the highly productive equipment is the considerable effort necessary for their previous cleaning and the high consumption of solvents that must be recovered or incinerated, and waste waters that must be treated in order to be released in the environment.

Slurry-Seal is the consecrated english term for the cast bituminous asphaltic mixture at environmental temperature. This mixture is obtained mainly from selected aggregates, water, cement and cationic asphaltic emulsion, mixed and applied by means of mobile self-propelled equipment or mounted on a transportation mean. Slurry-Seal type mixture has a low content of hollows, being essentially self-levelling, is stable and resistant to deformation. It can be produced with different sorts of aggregates and types of coloured asphaltic emulsion that allow the optimization of the mixture properties. Being applied in thin layers, the mixture offers the advantage of maturing quickly in a hard but flexible structure.



Fig. 3. – Coloured Slurry-Seal.

Microsurfacing is defined, according to ISSA, as a Slurry-Seal asphaltic mixture in which the mixture binder is modified with polymers, mainly thermoplastic type. The modification with polymers allows the use of some large aggregates without running the risk of deterioration. Due to the higher cohesion of the modified binder, by comparison with the unmodified one, it can be applied in thicker layers than the Slurry-Seal mixture, without running the risk of deformation.

The roads on which this mixture is applied are restored quickly, as the mixture takes little time to harden after its application on the support layer.

According to the technical regulations, the asphaltic road layers made of this mixture are meant for the current maintenance of the road coating and are 8...16 mm thick. They are prepared and brought in at the environmental temperature and are made of a homogenous mixture of 0...4 sort crushing sand, 4...8 and/or 8...10 sort broken stone, filler, cement (pre-moistened with water and additive solution for the delay of the breakage of the asphaltic emulsion) and slow-

breakage cationic asphaltic emulsion with modified bitumen.

Very thin bituminous layers of this mixture may be simple or double. As regards double layers, the inferior layer plays the role of reformation for the remove of road lumps and of bringing the transversal profile to the set parameters.

3. Conclusions

Aesthetically speaking, the coloured asphaltic coatings are used for parking spaces, park alleys, footways, sports grounds or children's playgrounds.

If the society development level allows life to be protected as a part of the environment, the necessary costs do not have to be and are not a problem for European countries. The coloured asphaltic emulsions are an eloquent example to this effect: they are meant for road warning for the prevention of traffic accidents and saving human lives, protecting the environment through ecologic technologies of application without discharging polluting agents, for the conservation of natural oil resources by using synthetic bitumen and last but not least, for the creation of pleasant life conditions in a more colourful urbane landscape.

The aim of the use of coloured asphaltic coatings is to improve the traffic conditions and the visual comfort induced by the aesthetic effect created by the harmony of colours in the urbane space.

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MIXTURI ASFALTICE COLORATE LA RECE

(Rezumat)

Într-un viitor deloc îndepărtat drumurile vor fi colorate, fie și numai suprafața de rulare, iar bitumul negru va fi înlocuit cu lianți sintetici, unii chiar vegetali.

Asfaltul colorat se obține din lianți de sinteză, cu aspect translucid. Culorile sunt obținute prin adăugarea de pigmenți anorganici, în principal oxid de fier pentru culoarea roșie, oxid de crom pentru culoarea verde, dioxid de titan pentru cea albă. Înlocuirea culorii negre are ca efect reducerea temperaturii suprafeței de rulare în sezonul cald ceea ce conduce la îmbunătățirea protecției termice a stratului asfaltic și reducerea ornierajului.