

## **Study about the sustainability of mastic asphalt covering layers on federal highways under heavy loads**

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## **Abstract**

In the framework of a master diploma one made a comparison between the sustainability of hot rolled asphalt and mastic asphalt covering layers. On this occasion, one collected actual data about the economy of the mastic asphalt construction method considering a long lifetime.

Mastic asphalt applied on federal highways under heavy loads proves its durability by a long lifetime. In the whole Federal Republic of Germany, one finds examples proving that. One examined, documented and did research work from the time of construction up to now for mastic asphalt road tracks under heavy loads – some 20 years old, some others over 40 years old. These road tracks are located in Bavaria, Berlin, Hesse, North Rhine Westphalia and Thuringia. The special composition is responsible that mastic asphalt is a durable covering layer. However, especially the higher binder content in comparison to the production costs of hot rolled asphalt is also responsible that mastic asphalt is a more cost intensive construction method. On basis of the information and results coming out of the analysis of the road tracks one made a life cycle scenario for covering layers on federal motorways under heavy loads.

Taking into consideration a lifetime of 30 years, mastic asphalt is, and that very clearly, the more cost effective covering layer. One can show the results of the costs analyses comparing the lifecycle cost of both covering layers. The lifecycle costs consists of the production costs and the maintaining costs. When the production costs are in the focus, then the costs of the production of a mastic asphalt covering layer is 50 percent higher than the production costs of a hot rolled asphalt covering layer. After calculating the production costs one did the same for the maintaining costs. The maintaining costs consists of the maintenance costs and the refurbishments costs. The result regarding a lifetime of 30 years is as follows: The maintaining costs of a mastic asphalt covering layer corresponds to only 5 percent of the maintaining costs of a hot rolled asphalt covering layer.

The next step was to analyse the lifecycle costs of the covering layers to compare – and this over a period of 30 years. The comparison of the lifecycle costs of mastic asphalt and hot rolled asphalt clearly shows that the investment costs are changing during the period of 30 years and that the mastic asphalt construction method offers cost advantages of over 60 percent. The economic limit over a period under review of 30 years is reached after 15 years. Regarding the total costs, after this time limit mastic asphalt is favourable to hot rolled asphalt. The reason: Hot rolled asphalt normally needs one refurbishment interval more than mastic asphalt during the period under review. That is the reason why, if one anticipates and calculates lifecycle costs in advance, one has the possibility to act in a sustainable way.