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ANALYSIS OF WARM MIX ASPHALT (WMA) IMPLEMENTATION IN LATVIA

WMA is a relatively new technology that allows significant lowering of the production and pavement temperature of conventional hot mix asphalt (HMA). The temperature reduction range varies depending on what WMA product is used, but the general classification of asphalt depending on the production temperature is:

– cold mix (0 ^{o}C - 40 ^{o}C)
– half warm asphalt (60 ^{o}C - 100 ^{o}C)
– warm mix asphalt (100 ^{o}C - 140 ^{o}C)
– hot mix asphalt (from 140 ^{o}C)

WMA promises various benefits, e.g. lowering the greenhouse gas emissions, lowering energy consumption, improved working conditions, lower binder viscosity, better compaction, etc. These technological advantages of WMA allow to use it not only as substitute for conventional HMA by applying the same asphalt specifications, but also to use it in circumstances, where usage of HMA would not be eligible.

WMA technologies can provide cold weather paving, which can be beneficial for Latvia as the usual paving season here is only about 6 months long. Paving during the nights and/or paving seasons extending by about two months in a year could be accomplished. This can be achieved through the reduction of binder viscosity in the production and paving temperatures, which allows compacting the layer at lower temperature with the same density as HMA. And as the difference between mix and ambient temperature is smaller than for HMA longer compaction window is provided. In addition to that producing WMA at HMA temperatures will permit even longer time for compaction. Based on literature findings, organic additives (e.g. Sasobit) and some of the chemical technologies (e.g. Rediset WMX) would be suitable for accomplishing these goals in Latvian conditions. Field trials were conducted in Germany with Sasobit at temperatures ranged from +1^{o}C to + 3^{o}C and better density was achieved compared to HMA mixture. Similar to cold weather paving, longer haul distances are promised because of possibility to compact mixture in lower temperature. Therefore producing WMA technology mixtures at temperatures traditional for HMA, more distant sites and large urban areas like Riga can be served from larger distances without losing workability. This means expanded market areas and reduced asphalt cost due to decrease in mobilisation costs. Another benefit for city or high maintenance roads that need to be opened as soon as possible is that faster put into operation times can be achieved through less time needed for cooling the mixture as the initial temperature is significantly lower. This can also be important for expanding airports, like International Airport of Riga, where the stretch of time for construction can be very tight. Sometimes even several lifts are required to be placed during the night.

Another aspect of WMA implementation is the rising demands of reducing greenhouse gas emissions in atmosphere. As Latvia is member of EU and has signed Kyoto protocol we have to follow the demand of reducing CO_2 in atmosphere. The usage of WMA would help to reduce carbon footprint of asphalt industry. Reduced emissions, less noise and fumes would also allow slightly easier introduction of new asphalt plants to urban areas.

All of these application possibilities still have to be fully evaluated and WMA technology should be compared with HMA through cost/performance ratio, but the promised benefits suggest serious considering of the usage of WMA technologies in Latvia.