P2-5 Analyzing Carbonaceous Particles from Paving Emissions

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Mastic asphalt (MA) is an important construction material mainly used for infrastructure pavements as well as industrial and garage floors. As mastic asphalt construction sites are often limited in space, the prevalent form of construction is by manual paving. Therefore, the emissions caused by mastic asphalt are not only relevant for the environment, but also highly relevant for workers' health. In this study, we examine four mastic asphalt mixtures in terms of their emissions and worker exposure at various construction temperatures, ranging from 195 °C to 245 °C. We conducted three laboratory studies and a field study to evaluate the emissions away from the construction site, emissions in close proximity to the construction site, direct worker exposure and, for the very first time, also the absolute emissions in mass PM10 a.d. per mass of MA. The experiments show that a big part (80 wt%) of the PM10 a.d. emissions consists of particles smaller than 0.8 µm a.d. and are therefore very health relevant. Furthermore, we could show consistently in all our experiments that decreasing the paving temperature by 50 °C (by using a MA mixture workable below 200 °C) leads to an emission reduction of up to 70%.

Weiss, F., et al. Reducing paving emissions and workers' exposure using novel mastic asphalt mixtures, Building and Envrionment, 137, 51-57, 2018.