

UV-SPECTROSCOPY AS A SCREENING TOOL FOR THE DETECTION OF TAR IN RECYCLED ASPHALT PAVEMENT

S.O.Vansteenkiste *

Researcher, Belgian Road Research Centre (BRRC), BE

BRRC, Asphalt Pavements, Bituminous Applications and Chemistry Division,
Woluwedal 42, B-1200 Brussels, Belgium, s.vansteenkiste@brrc.be

ABSTRACT

The analysis of recycled asphalt pavement (RAP) contaminated with Polycyclic Aromatic Hydrocarbons (PAHs) originating from coal derivatives such as tar, necessitates chromatographic separations linked to sophisticated detectors. Latter analyses can only be performed in well-equipped laboratories, are expensive and time consuming. However, road constructors, asphalt producers or recycling units often require a rapid, sensitive and reliable detection tool applicable in the field.

In this context, the BRRC conducted a research project of which the main objective included both the development as well as the validation of a 2-step screening method for PAHs. In a first step, PAHs were gathered by a selective solvent extraction, typically within half an hour. In a second step, solutions were probed for analyte contamination by UV-spectrophotometry using a commercially available field-portable apparatus.

Analysis of the UV-spectra allowed the identification of diagnostic absorption maxima which correlated well with the presence of particular PAHs and therefore coal derivatives. Linear calibration curves enabling the analyte quantification over a broad concentration range were established. The performance of this methodology was validated by determining its precision, repeatability, reproducibility and assessing its sensitivity expressed as both the limit of detection as well as the limit of quantitation.

KEYWORDS: RAP, recycling, PAH, tar, UV-spectroscopy