

ABSTRACT

Since ancient times, Bitumen is widely used in paving industry. It has also some applications in roofing industry. Due to heavy traffic situation, varying weather conditions and environmental considerations, we need to improve the properties of bitumen to improve its service life. For improving property, bitumen binders were modified by using waste plastic like used water bottles (WP), Fly ash (FA). The binders were prepared by using melt mixing technique. Response Surface Methodology (RSM) approach was chosen for optimization of design parameters. In RSM studies, mixing parameters were chosen as concentration of composite, temperature and time of mixing in the case of softening point optimization of modified bitumen and time, pulse and amplitude in the case of nano sized fly ash optimization. It is confirmed by the experiments like penetration, ductility, softening point, viscosity for modified bitumen that the use of WP and FA composites has improved their properties like thermo stability and make them less temperature susceptible, which will help to prevent high temperature pavement failure like rutting. Furthermore a comparative study has been done for NFAPMB, FAPMB and PMB and the result states that NFAPMB has more improved properties than other two. Characterizations such as FTIR, SEM, TGA and EDX were done in the case of fly ash (for both fresh and sonicated sample) to study the effect of sonication in particle size. It was found that high efficient melt mixing is an effective process for good dispersion of modifiers in the bitumen matrix. Thus we achieve the required improvement in property for the bitumen matrix for better application.