



THE COMPARATIVE STUDIES OF THE PROPERTIES OF JOINT SEALANTS PRODUCED BY MANUFACTURERS AND IN LABORATORY CONDITIONS WITH THE USE OF HIGHLY MODIFIED BITUMEN

BADANIA PORÓWNAWCZE WŁAŚCIWOŚCI MAS ZALEWOWYCH WYTWARZANYCH PRZEZ PRODUCENTÓW I W WARUNKACH LABORATORYJNYCH Z WYKORZYSTANIEM ASFALTU WYSOKOMODYFIKOWANEGO

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Abstract

Joint sealants produced on the basis of modified bitumen are an effective mean for protection of expansion joints on bridges and for repair of cracks in various road surfaces. A comparative study was performed to evaluate seven hot-applied joint sealants obtained commercially and three joint sealants produced in laboratory conditions with different contents of highly modified asphalt binder (40 to 100%). The basic properties of the joint sealants and asphalt binders were evaluated, including penetration, softening point, breaking point and elastic recovery. Additionally, Fourier infrared spectroscopy (FTIR) method was used to evaluate the chemical composition of the asphalt binders. The variability of the basic properties of joint sealants was estimated in the range from -77.1% to 43.6% in relation to the base asphalt binder. It has been established that the addition of crumb rubber, hydrated lime and rapeseed oil may be viable in controlling the parameters of the joint sealants.

Keywords: hot-applied joint sealant, highly modified bitumen, expansion joint, hydrated lime, crumb rubber

Streszczenie

Zalewy szczelin produkowane na bazie asfaltów modyfikowanych są skutecznym rodzajem zabezpieczenia przerw dylatacyjnych na obiektach mostowych oraz naprawy uszkodzeń różnych typów nawierzchni drogowych. Badaniami porównawczymi objęto siedem mas zalewowych stosowanych na gorąco, wytworzonych przez krajowych i zagranicznych producentów, oraz trzy masy zalewowe wytworzone w warunkach laboratoryjnych o różnej zawartości wysokomodyfikowanego lepiszcza asfaltowego (40 do 100%). Ocenie poddano podstawowe cechy lepiszczy asfaltowych oraz parametry wyprodukowanych na ich bazie mas zalewowych, obejmujące: penetrację w 25°C, temperaturę mięknięcia, temperaturę łamliwości Fraassa i nawrót

sprężysty. Dodatkowo, do porównania składu chemicznego lepiszczu asfaltowych wykorzystano metodę spektroskopii fourierowskiej w podczerwieni (FTIR). Oszacowano procentowy zakres zmienności podstawowych właściwości mas zalewowych w relacji do bazowego lepiszczu asfaltowego w granicach od -77,1% do 43,6% w relacji do bazowego lepiszczu asfaltowego. Ustalono, że istotnym regulatorem parametrów mas zalewowych mogą być dodatki odpadów gumowych, wapna hydratyzowanego oraz oleju rzepakowego.

Słowa kluczowe: zalewa szczelin na gorąco, asfalt wysokomodyfikowany, szczelina dylatacyjna, wapno hydratyzowane, odpady gumowe

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