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Bo Yao [a,*], Fangchao Li [a], Xiao Wang [b], Gang Cheng [b]

[a] Department of Civil Engineering, School of Science, Nanjing University of Science and Technology, 200 Xiaolingwei, Nanjing 210094, China

[b] School of Transportation, Southeast University, 35 Jinxianghe Road, Nanjing 210096, China

*Corresponding author.

Tel./fax: +86 25 87794368

E-mail address: blade@seu.edu.cn (B. Yao).

ABSTRACT

Shear characteristics of steel-asphalt interface under the influences of temperature, normal stress level and tack coat material were investigated. The direct shear tests were conducted on composite specimens with epoxy asphalt (EA) and polymer modified asphalt (PMA) tack coat materials at temperatures of 25 and 60°C and normal stress levels of 0, 0.2, 0.4, and 0.7 MPa for each temperature. Results show that the failure modes include adhesive failure at the primer-tack coat interface and material failure of asphalt concrete. Steel-asphalt interface shows strain softening behavior until it reaches the sliding state. The shear strength and the shear reaction modulus increase with decreasing temperature and increasing normal stress levels. The specimens with EA tack coat provides much higher interface shear strengths than those with PMA tack coat at 25 and 60°C. In addition, the failure envelopes of the shear strength and residual shear strength were obtained for combinations of tack coat materials and temperature conditions based on the Coulomb failure law.

Keywords: Steel bridge deck, Asphalt tack coat, Interface, Shear characteristics, Direct shear test