

Title: Slanted connection at elevated temperature under various loadings

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Abstract: This paper presents a detailed comparison of two types of slanted end-plate connections, under symmetric and nonsymmetric gravity loads, in terms of friction factors and angles of slanted end-plate connections. This study contributes to better understanding of roll of slanted end-plate connections under non-symmetric gravity loads on the value of the induced initial axial force due to elevated temperature in steel beams, and a comparison of the effect of symmetric gravity loads on the behaviour of such connections, before and after elevated temperature. The results imply that, before any thermal effects, a non-symmetric gravity load can be more critical than a symmetric load; the average ratio of axial force of a non-symmetric load to a symmetric load was found to be 1.49–1.57. This value was determined to be 1.64–1.90 when friction bolts instead of normal bolts were used. On the other hand, when a steel beam is subjected to a temperature increase, the amount of reaction and initial axial forces in the steel beam are not related to the type of loading. This can be considered an advantage of the slanted end-plate connection compared with a conventional vertical end-plate connection, and it could be developed in structures exposed to longitudinal movement due to expansion. The optimum angle of the slanted end-plate connection in both cases ranged from 17° to 60°.