

Reliability Study of Steel Headed Stud Shear Connector Exposed to Fire

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Abstract : This paper presents a study on reliability of shear connector exposed to fire situation in accordance with Eurocode 4. The reliability analysis i reliability analysis is based on First Order Second Moment Integration Technique (FOSMIT) using FORM 5. Performance functions for shear connector are derived for normal and under fire condition and their implied safety levels are evaluated. Four (4) design variables which include ultimate tensile strength, diameter of the stud, temperature and span of the steel beam are treated as random variables with their statistical characteristic adopted from literature. Results show that for normal condition the β - value decrease from 7.95 to 5.43 which show it is conservative in safety level for normal condition. Under fire condition, β - value decrease from 2.88 to - 0.32 with corresponding load ratio of 0.2 to 1.2. It was also shown from sensitivity assessment, that the temperature and span of the beam decrease with increase in their β - values while ultimate tensile strength and diameter of the stud increase with increase in their β - values for a given load ratio of 0.2 to 1.2.

Keywords : Composite steel beam, Fire condition, Shear stud, Sensitivity study

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