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Probabilistic Analysis of Cracking Moment of RC T-Beam Bridge Girder

Authors | Authors and affiliations

A. Ranjith, K. Balaji Rao, A. Tanvi Rai, Thripthi, K. Manjunath

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Abstract

Cracking of reinforced concrete flexural members is a highly random phenomenon. The evaluation of cracking resistance of a reinforced concrete structural element is important from a view point of its performance in limit state of serviceability i.e., in cracking. Deterministic analysis of cracking moment for all the beams is carried out. Probabilistic analysis of cracking from different cross sections of RC T-beam bridge girders is performed. For this purpose, different cross sections of RC T-beam bridge girders designed according to MORTH for seven spans namely 10, 12, 14, 16, 18, 21 and 24 m are considered. Probability of cracking of each cross sections of beam is determined using relative frequency approach within the framework of Monte Carlo Simulation. With respect to the distribution of basic variables considered in this study, cracking moment of RC T-beam is found to follow lognormal distribution. The probability of failure against cracking is found to be very high. Cracking moment is found to be independent of load combinations adopted in the study. The present article can be used as a reference for examining the beams for limit state of cracking.

Keywords

Reinforced concrete Cracking Cracking moment T beam girder Basic variables

References

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Reliability Analysis of RC T-Beam Bridge Girder Subjected to Chloride-Induced Corrosion

Authors Authors and affiliations

A. Ranjith, K. Balaji Rao, Thripthi, A. Tanvi Rai, K. Manjunath

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One of the main causes of reinforced concrete degradation is chloride-induced corrosion. Chloride-induced corrosion depends on many factors like properties of the material, loading on the structure and environmental condition. There is much research on the deterioration of concrete structures over the years; but there is relatively little research on changing climate affecting the deterioration, which is the topic of this paper. The present study is purely analytical wherein conceptual T-Beam bridge girder has been taken for the prediction of time to corrosion initiation and corrosion propagation, incorporating effect of climatic condition. For comparison, eight study locations are selected. Corrosion initiation time is predicted for each location considering the climatic data of the corresponding location. With the variation in the temperature and relative humidity data at different study location, large variation in corrosion initiation time is found.

Keywords

Chloride-induced corrosion Temperature Relative humidity Diffusion coefficient

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