Visualizing the behaviour of reinforced concrete beam structure under various types of loadings.

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Abstract

This paper describes an approach to visualizing the detection of failure in Reinforced Concrete Beam Structure under various types of loadings. Several Reinforced Concrete Design (RCD) tools have been developed to support RCD, but there is little evidence that these solutions address the needs of the users. We studied RCD analysts' daily activities in order to understand their routine work practices and the need for designing RCD tools. Our approach is based on the principle of information visualization which has been applied in related fields. The Model-View-Controller (MVC) architecture is used to alleviate the black box syndrome associated with the study of algorithm behaviour for RCD for Beams. We propose a Visualization "exploratory" tool that assists the RCD designer in understanding the actual behaviour of the RCD Beam algorithms of choice and also in evaluating the performance quality of the algorithm. We demonstrate the feasibility of our approach using Simply Supported Reinforced Concrete Beam Structure (SSRCBS). We review Structural Analysis of Simply Supported Beam; our choice of design is governed by British Standard Code of Practice. VisRCD Beam Interface is created as our input visualization environment while borrowing and enhancing AutoCAD Interface as the output visualization environment. The analysis led to the development of a process model for SSRCBS work and related visualization needs. Our hypothesis testing reveals that RCD analyst will perform task and achieve acceptable results in less than 6½ min. The tool provides great benefit to the user by making their observations and judgement count.