

PLASTIFICATION OF RC FRAME UNDER MONOTONIC LOADING

Trogrlić, B.; Mihanović, A. & Balić, I.

Abstract: In this paper the plastification of the reinforced concrete (RC) frames are analyzed by numerical model [1, 2] which includes material and geometric nonlinearity according to small displacement theory. The global iterative-incremental procedure is used with a monotonic increase of loading until collapse of system which is caused by occurring of mechanism and/or losing of stability. The composite cross sections are described by numerical model. For analysis of space frames, the torsional effect and consequently the effect of the shear force of the reinforced concrete element are observed on the so-called comparative body. It is formed so that the square elements from the cross-section discretization are extended along the whole linear finite element and form an elastic body discretized by 3D brick finite elements (Figure 1b). The essential properties of results with plastification of RC frames are changes of position of plastic hinges. After the first appearance, during increment procedure, plastic hinge can disappear and appear again. The complete process of plastic hinge appearance is non-continuous. The dominant order of the plastic hinge appearance i.e. the dominant failure mechanism is only what can be determined.

Key words: RC frames, plastic hinges, monotonic loading, collapse mechanism.



Authors' data: Trogrlić, B.[oris], Ph. D., assistant professor, the University of Split, the Faculty of Civil Engineering and Architecture, Matice hrvatske 15, Split, Croatia, boris.trogrlic@gradst.hr; Mihanović, A.[nte], Ph. D., the University of Split, the Faculty of Civil Engineering and Architecture, Matice hrvatske 15, Split, Croatia, ante.mihanovic@gradst.hr; Balić, I.[van], junior researcher, the University of Split, the Faculty of Civil Engineering and Architecture, Matice hrvatske 15, Split, Croatia, ivan.balic@gradst.hr.