



2ND INTERNATIONAL SYMPOSIUM K-FORCE 2019

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ASEISMIC MODELING OF THE COLUMN ACCORDING TO THE EUROPEAN REGULATIONS

INTRODUCTION

The paper gives an analysis, recommendations for the possibility of modeling behavior in the postelastic area on the example of the basic element of bearing structure - reinforced concrete column of the industrial hall, in accordance with the principles of Eurocode 8. The principle of proper cross section confining is shown, according to the rules of Eurocode 8, which significantly increases the boundary dilatation on the verge of fracture, and therefore the maximum curvature of deformation.

CORE IDEA OF THE RESEARCH

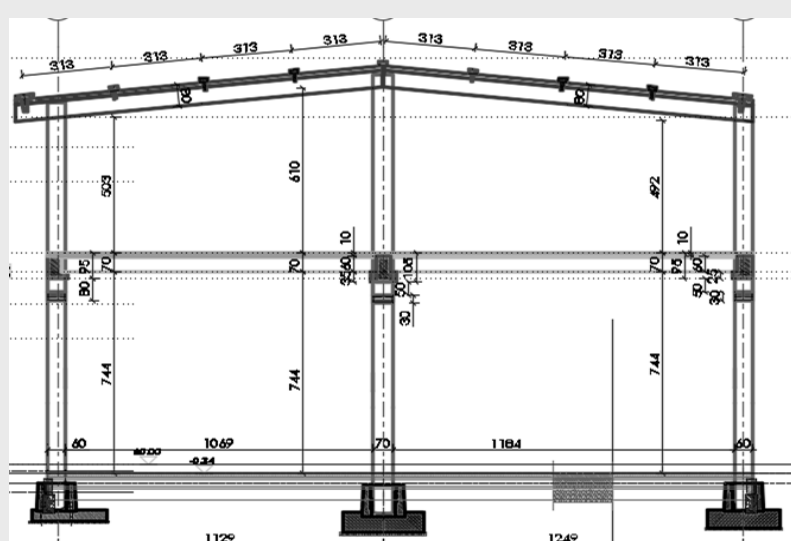
Seismic analysis according EC8 - basic principles for columns - column confining

According to the European standard EN 1991 - Eurocode 1 seismic actions must be considered as a load case for which a detailed calculation procedure is given in EN 1998 - Eurocode 8.

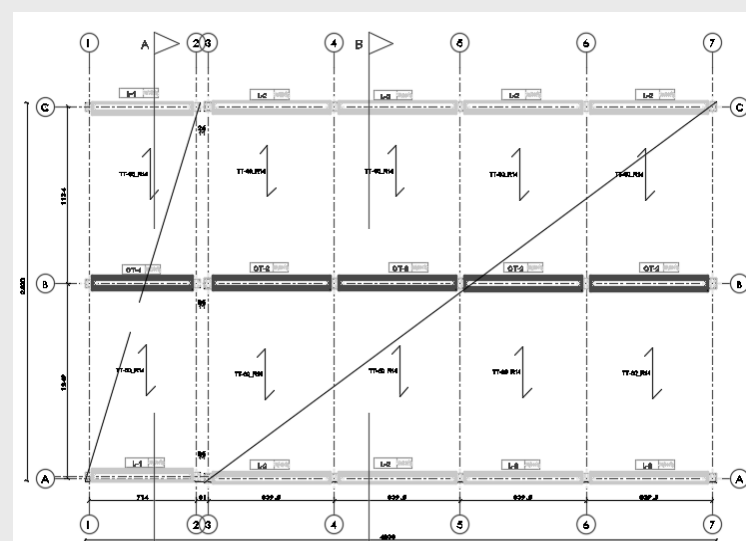
As a basic bearing element of structures, the collapse of the column is critical, so in the case of seismic analysis it is necessary to define its plastic behavior. In the area of plasticity, local buckling of the longitudinal reinforcement in column must be taken into the account, which occurs due to the appearance of the insufficient cross section confining. Confining is carried out in a critical area of the column with the correct selection of hoops or cross ties with the appropriate spacing.

Worked example

Selection of the input data for seismic analysis and an example of the calculation for the cross section confining is given for the reinforced-concrete column of the prefabricated building with frame system, planned to be built in Laktaši municipality in Bosnia and Herzegovina.



Cross section and base floor design



Seismic hazard map according to NA to EC8

According to Eurocode 8, axial force control is performed, reinforcement diameter for confining on critical regions is calculated and spacing between the hoops is defined such that a minimum ductility is ensured and local buckling of longitudinal bars is prevented.

Conclusions

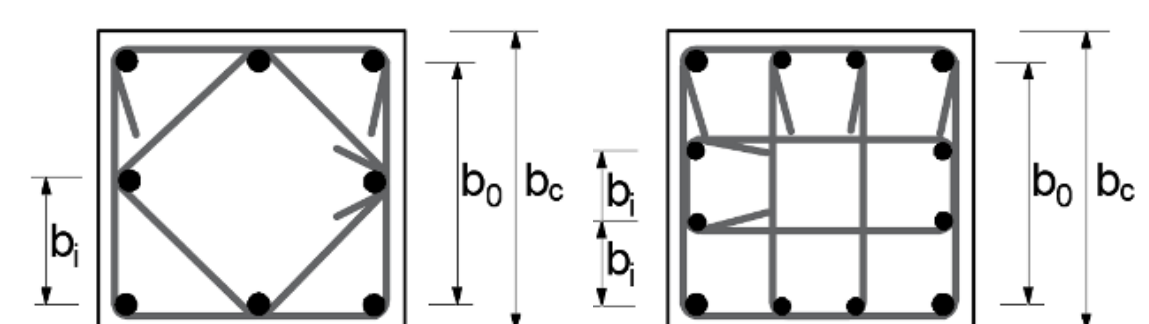
Cross-section confining is clearly defined in Eurocode 8. By confining, the concrete in column is in tri-axial state due to maximum exploitation load. Vertical armature is held by a transverse armature with proper spacing. Confining significantly increases the boundary dilatation when the cross-sectional fracture is reached, and therefore the maximum deformation capacity. The damage is such that the construction can be repaired in the most optimal, constructive manner.

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*General confining solution (left)
two-arm confining in the example (right)*

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